CONTENTS

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ORIGINAL COMMUNICATIONS.

MEMOIRS AND CASES.

ART. PAGE

I. Traumatic Neuralgia; Section of Median Nerve. By S. Weir Mitchell, M.D., Member of National Academy of Sciences. (With five wood-cuts.) 17

II. Case of Exsection of the Brachial Plexus of Nerves for the Relief of Painful Neuroma of the Skin. By F. F. Maury, M.D., Surgeon to the Philadelphia Hospital, and Louis A. Duhring, M.D., Clinical Lecturer upon Diseases of the Skin in the University of Pennsylvania. (With a wood-cut.) 29

III. Retinal Hemorrhage and its Connection with Cerebral, Cardiac, and Renal Lesions. By Charles S. Bull, A.M., M.D., Assistant Surgeon to the New York Eye and Ear Infirmary; Microscopist to the Manhattan Eye and Ear Hospital. 37

IV. On Laparotomy, or Abdominal Section, as a Remedy for Intussusception; with Tables showing the Results of the Operation in cases of this Affection, and in those of other forms of Acute Obstruction of the Bowels. By John Ashhurst, Jr., M.D., Surgeon to the Episcopal Hospital, Surgeon to the Children's Hospital, etc. 48

V. On Thrombosis of the Cerebral Veins, and Sinuses of the Dura Mater. (Second paper.) By John A. Lidell, M.D., of New York. . . . 64

VI. On the Value of High Powers in the Diagnosis of Blood Stains. By Joseph G. Richardson, M.D., Lecturer on Pathological Anatomy in the University of Pennsylvania, and Microscopist to the Pennsylvania Hospital. (Read before the Biological and Microscopical Section of the Academy of Natural Sciences, and recommended for publication in the American Journal of the Medical Sciences.) 102

VII. On Transfusion of Blood, with a Report of Eight Cases, and a Description of a Convenient Apparatus for Performing the Mediate Method. By Thomas G. Morton, M.D., one of the Attending Surgeons of the Pennsylvania Hospital; Emeritus Surgeon to Wills (Ophthalmic) Hospital, Philadelphia. (With three wood-cuts.) 110

VIII. Case of Mollities Ossium. By John Neill, M.D., Associate Professor of Clinical Surgery in the Hospital of the University of Pennsylvania. . 119

ART. PAGE

IX. Cases Illustrating the Application of Elastic Ligatures in Surgery. By Stuart Eldridge, M.D., in charge of Imperial School of Medicine, Hakodate, Japan. (With a wood cut.) 126

X. Report of Twenty Cases of Stricture of the Male Urethra, with Treatment. By A. Vanderveer, M.D., of Albany, N. Y. (With a wood-cut.) 129

XI. Cases of Penetrating Wound of the Abdomen and Chest, with Remarks upon the Treatment of such Injuries. By James C. Rea, M.D., Resident Physician to the Episcopal Hospital, Philadelphia. 147

XII. A Case of Lumbar Colotomy for Obstruction of the Rectum by Cancerous Tumours of the Womb. By John H. Packard, M.D., one of the Surgeons to the Episcopal Hospital, Philadelphia. 150

XIII. Alcoholism, Rheumatism, Bromo-iodism, Cerebral Embolism (?), Aphasia, Paralysis; Recovery. By A. F. A. King, M.D., one of the Physicians to Providence Hospital, Washington, D. C., etc. 153

XIV. Case of Fracture of the Neck of the Femur treated by a New Apparatus. By J. C. Bishop, M.D., of Middleport, Ohio. (With a wood-cut.) 155

XV. Description of a Hospital Bed-Elevator and Carriage, designed especially for Surgical Wards. By Thomas G. Morton, M.D., Surgeon to Pennsylvania Hospital, and Emeritus Surgeon to Wills (Ophthalmic) Hospital. (With a wood-cut.) 158

XVI. Sulphate of Zinc in the Treatment of Poisoning by Rhus Toxicodendron and R. Radicans. By Charles H. Humphreys, M.D., of Brandt, Miami Co., Ohio. 160

REVIEWS.

XVII. A Practical Treatise on the Surgical Diseases of the Genito-Urinary Organs, including Syphilis. Designed as a Manual for Students and Practitioners. With Engravings and Cases. By W. H. Van Buren, A.M., M.D., Professor of the Principles of Surgery, with Diseases of the Genito-Urinary System and Clinical Surgery, in Bellevue Hospital Medical College, etc., and E. L. Keyes, A.M., M.D., Professor of Dermatology in Bellevue Hospital Medical College, etc. 8vo. pp. xvi., 672. New York: D. Appleton & Company, 1874. 161

XVIII. A Manual of Toxicology, including the consideration of the Nature, Properties, Effects, and Means of Detection of Poisons, more especially in their Medico-legal Relations. By John J. Reese, M.D., Professor of Medical Jurisprudence and Toxicology in the University of Pennsylvania, etc. 8vo. pp. 507. Philadelphia: J. B. Lippincott & Co., 1874. 173

XIX. A Treatise on Therapeutics, comprising Materia Medica and Toxicology, with especial reference to the application of the physiological action of drugs to clinical medicine. By H. C. Wood, Jr., M.D., Professor of Botany and Clinical Lecturer on Diseases of the Nervous System in the Medical Department of the University of Pennsylvania, etc. 8vo. pp. 578. Philadelphia: J. B. Lippincott & Co., 1874. . . . 81

XX. The Principles and Practice of Medical Jurisprudence. By Alfred Swaine Taylor, M.D., F.R.S., Lecturer on Medical Jurisprudence in Guy's Hospital. Second edition. 2 vols. 8vo., pp. xvi., 723, xii., 672. Philadelphia: Henry C. Lea, 1873. 185

ANALYTICAL AND BIBLIOGRAPHICAL NOTICES.

XXI.—Obstetrical Transactions.

1. Transactions of the Obstetrical Society of London. Vol. XV. For the year 1873. 8vo. pp. lx., 309. London: Longmans, Green & Co., 1874.
2. Proceedings of the Dublin Obstetrical Society. For session 1872–73. 8vo. pp. xvi., 202. Dublin: Fannin & Co., 1873. 193

ART. PAGE

XXII. The West Riding Lunatic Asylum Medical Reports. Edited by J. Crichton Browne, M.D., F.R.S.E. Vol. III. 8vo. pp. vi., 349. London: Smith, Elder & Co., 1873. 201

XXIII. Transactions of State Medical Societies.

1. Transactions of the Indiana State Medical Society, 1873. 8vo. pp. 142.
2. Transactions of the Medical Association of the State of Alabama, 1873. 8vo. pp. 112.
3. Transactions of the Colorado Territorial Medical Society. 8vo. pp. 56. 205

XXIV. Reports of State Boards of Health.

1. Fifth Annual Report of the State Board of Health of Massachusetts. 1874. 8vo. pp. 550. Boston, 1874.
2. Second Biennial Report of the State Board of Health of California. From 1871 to 1873. 8vo. pp. 235. Sacramento, 1873.
3. First Annual Report of the State Board of Health of Michigan. For 1873. 8vo. pp. 101. Lansing, 1874. 208

XXV. Third Annual Report of the Board of Health of the Health Department of the City of New York, April 11, 1872, to April 30, 1873. 8vo. pp. 349. New York: D. Appleton & Co., 1873. 215

XXVI. The Toner Lecturers, instituted to Encourage the Discovery of New Truths for the Advancement of Medicine. Lecture I.—On the Structure of Cancerous Tumours, and the Mode in which Adjacent Parts are Invaded. By J. J. Woodward, Assistant Surgeon U. S. A. Delivered March 28, 1873. Washington: Smithsonian Institution. Nov. 1873. 219

XXVII. On the Government of the Retreat for the Insane, at Hartford, Connecticut. Printed for private use. Hartford, Connecticut, 1874. . 221

XXVIII. Lectures on the Diseases of Infancy and Childhood. By Charles West, M.D., F.R.C.P., Physician to the Hospital for Sick Children. Fifth American from the Sixth revised and enlarged English edition. 8vo. pp. 678. Philadelphia: Henry C. Lea, 1874. 225

XXIX. Reports of American Hospitals for the Insane.

1. Pennsylvania Hospital for the Insane.
2. Western Pennsylvania Hospital.
3. State Hospital at Danville.
4. Butler Hospital, Providence, Rhode Island.
5. Longview Asylum, Ohio.
6. Northern Lunatic Asylum, Virginia.
7. Northern Hospital, Oshkosh, Wisconsin.
8. Willard Asylum, Western New York.
9. State Lunatic Asylum, Utica, New York. 228

XXX. The Nature of Gunshot Wounds of the Abdomen and their Treatment: based on a Review of the Case of the late James Fisk, Jr., in its Medico-Legal Aspects. By Eugene Peugnet, M.D., etc. 8vo. pp. 96. New York: William Wood & Co., 1874. 233

XXXI. A Universal Formulary; Containing the Methods of Preparing and Administering Officinal and other Medicines. The whole adapted to Physicians and Pharmaceutists. By R. Egleseld Griffith, M.D. Third edition, carefully revised and much enlarged, by John M. Maisch, Phar. D., Professor of Materia Medica and Botany in the Philadelphia College of Pharmacy. With illustrations. 8vo. pp. 779. Philadelphia: Henry C. Lea, 1874. 234

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES IN THE MEDICAL SCIENCES.

Anatomy and Physiology.

PAGE

1. Bartholow's Experiments on the Human Brain. By Dr. Ferrier. 235
2. Further Researches on the Localization of Functions in the Brain. By Dr. Ferrier. . . 236
3. Neuropathic Origin of Simple Hydruria (Diabetes Insipidus) from Epidemic Cerebro-spinal Meningitis, Trauma, and Syphilis. By. Prof. Mosler. . . 238
4. Changes in the Muscular Tissue, after Division of Nerves. By Professor Bizzozero and C. Colgi. 239

PAGE

5. On Diapedesis. By Prof. J. Arnold 239
6. Origin of the Bile-ducts. By Professor Kupffer. . . . 240
7. Contributions on the Structure and Functions of the Bladder. By Dr. G. Jurié. . . . 240
8. Bladder with a Pouch communicating with a Third Ureter. By Mr. Fletcher Beach. . . 240
9. Ovulation without Menstruation. By M. de Sinéty. . . 240

Materia Medica, General Therapeutics, and Pharmacy.

10. Jaborandi, a new Sudorific and Sialagogue. By Drs. S. Coutinho, Rabuteau, and Gubler. . 241
11. On Eucalyptus and its Febrifuge Qualities. By Dr. E. Burdel. 241
12. Action of Chloroform. By Dr. Pollak. 242
13. Prof. Schiff's Studies on Ether and Chloroform. By Dr. T. G. Hake. 242
14. Physiological Action of Coca. By Dr. Alex. Bennett. . . 245
15. Importance of the Purity of Chloral Hydrate. By Dr. Oscar Liebreich. 246
16. Ergotin as a Means of Arresting Hemorrhage. By Dr. Drasche. 247
17. Active Agent of Ergot. By Dr. A. Wernich. . . . 248
18. Importance of Salts in Food. By Foster. 248

Medical Pathology and Therapeutics, and Practical Medicine.

19. General Angioleucitis of the Lungs. By Dr. Reynaud. . 249
20. Dizziness and its connection with Migraine. By Dr. T. Clifford Allbutt. 249
21. Albuminuria in Cases of Vascular Bronchocele and Exophthalmos. By Dr. J. Warburton Begbie. 250
22. Œsophagismus or Spasmodic Closure of the Œsophagus. By Dr. A. W. Foot. . . . 250
23. Extension of Melano-sarcoma by Embolism. By Prof. Eborth. 252
24. Paralysis of the Radial Nerve caused by an unusual mode of Lead-Poisoning. By Dr. Althaus. 252
25. The Local Treatment of Lung Cavities. By Drs. W. Mosler, Pepper, and Hutchinson . . 253
26. Employment of Bromide of Potassium as an Auxiliary in the Treatment of Intermittent Fevers. By Dr. Vallin. . . 256
27. Carbolic Acid in Intermittent Fever. By Surgeon McNally. 257
28. Hypodermic Injection of Carbolic Acid in Erysipelas. By Dr. Aufrecht. 257

PAGE

29. Guarana in Chronic Rheumatism. By Mr. E. A. Rawson. . 258
30. Gelseminum in Odontalgia and Facial Neuralgia. By Dr. J. Sawyer. 258
31. Internal Use of Sulphate of Atropia for Profuse Sweating. By Dr. Frantzel. . . . 258

PAGE

32. Treatment of Eczema, Lupus, and Cancer by Gurjon Oil. By Prof. Erasmus Wilson. . . 259
33. Treatment of Leprosy by Gurjon Oil. By Surgeon-Major J. Dougall, M.D. 259

SURGICAL PATHOLOGY AND THERAPEUTICS, AND OPERATIVE SURGERY.

34. Intravenous Injection of Chloral into the Veins for the Production of Anæsthesia in Surgical Operations and also for the cure of Tetanus. By Profs. Oré, Le Fort, Tilleaux, Verneuil, etc. 260
35. Tetanus Treated by Chloral Administered by the Mouth. By MM. Chauvel, Verneuil, etc. 262
36. Transfusion. Remarks by Drs. Kuster, Hasse, Sander, and Berns. 263
37. Cirsoid Aneurism treated by Injection of Perchloride of Iron; Death from Embolism. By Mr. J. F. West 263
38. Ligature of the Femoral Artery for the Cure of Elephantiasis Arabum. By M. Dumarquay. 264
39. Elephantiasis Græcorum. By Dr. Leisrink. 264
40. Strangulated Hernia Successfully Treated by Inversion. By Dr. Thornton. 264
41. Volvulus Treated by (Extra-Peritoneal) Abdominal Section; Breaking Down a False Ligament by Manipulation; Recovery. By Dr. Frederick Betz. 265
42. Extirpation of Kidney. By Drs. G. Simon, Brandt, and Stoddard. 266
43. Billroth's Case of Extirpation of the Larynx and Epiglottis; Artificial Vocal Diseases. By Dr. Carl Schwaighofer. . . 268
44. Resection of the Knee. By M. Cherru. 268
45. Tibio-Calcanean Osteo-Plastic Operation. By J. M. Le Fort. 269
46. Fractures of the Skull with Reference to Operative Interference. By Dr. Corley. . . 269
47. Treatment of Cystic and Fibro-cystic Bronchocele. By Dr. Morell Mackenzie. 270
48. The Contra-indications to the Removal of Melanotic Tumours, derived from the Examination of the Blood and the Urine. By M. Nepveu. 271
49. Extirpation of the Spleen. By Dr. Watson. 271

OPHTHALMOLOGY.

50. Derangements of Vision and their Relation to Migraine. By Dr. T. Clifford Allbutt. . . 272
51. Transitory Embolism of the Central Artery of the Retina. By Dr. L. Mauthner. . . 273
52. Treatment of Cataract previously to Operation. By Mr. Critchett. 273
53. Prolapse of the Vitreous Humour. By Mr. Piermé. . . 274
54. Foreign Bodies lodged within the Eye. By Mr. C. S. Jeaffreson. 274
55. Tubercular Ulceration of the Conjunctiva. By Dr. H. Stattler. 276

MIDWIFERY AND GYNÆCOLOGY.

56. Twin Pregnancy in a Double Uterus. By Dr. Perrault. . 277
57. Spurious Pregnancy with Labour. By Dr. Underhill. . 277
58. Post-partum Hemorrhage treated by the Application of the Solid Perchloride of Iron to the Interior of the Uterus. By Dr. A. H. Ringland. . . 279
59. Use of the Chloride of Iron in Post-partum Hemorrhage. By Dr. Lombe Atthill. . . . 281
60. Fatal Result of Injection into the Vagina. By M. Lorain. . 282

PAGE

61. Syphilis communicated by the Finger of a Midwife. By M. Bardinet. 282
62. Comparison between Hysterotomy and Ovariotomy. By M. Richet. 283
63. On the Local Treatment of Gangrenous Vulvitis in Young Girls by Iodoform Powder. By M. Parrot. 284
64. The Danger of Intra-Uterine Injections. 284

AMERICAN INTELLIGENCE.

Original Communications.

Addendum to Art. IV. On Laparotomy as a Remedy in Cases of Intussusception, etc. By John Ashhurst, Jr., M.D., etc. . 285
Epistaxis successfully Treated by Injections of Diluted Solution of the Sulphate of Iron. By Franklin N. Staub, M.D. . . . 285
Podophyllin for Acute Rheumatism. By R. F. Dyer, M.D. . 286

Domestic Summary.

Traumatic Aneurism of Neck, Ligation of Left Common Carotid, with Permanent Silver Wire Ligature. By Dr. R. W. Gibbes. 286
On the Spectrum of Bile. By Dr. J. C. Dalton. 287
Treatment of Uterine Fibroid by Hypodermic Injections of Ergotine. By Drs. Theophilus Parvin, A. Reeves Jackson, J. H. Etheridge, H. P. Merriman, and S. Fisher. 288
Inversion of Uterus; Prompt Replacement. By Dr. G. W. H. Kemper. 288
Report on the Ovaries removed by Dr. Thomas. By Dr. Noeggerath. 289
Bromide of Ammonium in Catamenial Excesses. By Dr. J. K. Black. 289
Observations on the Normal Pulse, Respiration, and Temperature of Puerperal Women. By Dr. G. Wilds Linn. 289
Hydro-chloral by the Rectum in the Vomiting of Pregnancy. By Dr. D. B. Simmons. . . 290
Drainage in Obstinate Chronic Inflammation of the Bladder. By Dr. Hunter McGuire. . . 290
Restraint of Hemorrhage during Operation in the Mouth. By Prof. E. Andrews. 290
Surgical Treatment of Naso-pharyngeal Polypi. By Dr. David W. Cheever. 291
The Influence of Anæsthetics on the Vaso-motor Centres. By Dr. H. P. Bowditch and Charles S. Minot. 291
Modification of Trommer's Test for Sugar. By Dr. George B. Fowler. 291

THE

AMERICAN JOURNAL

OF THE MEDICAL SCIENCES

FOR JULY 1874.

ART. I.—*Traumatic Neuralgia; Section of Median Nerve.* By S. WEIR MITCHELL, M.D., Member of the National Academy of Sciences. (With five wood-cuts.)

MISS T. at the age of two and a half years ran a splinter into the palm of the right hand over the point at which the median nerve divides in order to send branches to the thumb and fingers. The fragment, which came from a barrel hoop, was said to have been, when it entered, a third larger than when taken away twenty years after. It passed so deeply into the hand that it was thought best to poultice the part and encourage suppuration before removing the foreign body. To the physician's surprise the wound healed rapidly, every sign of irritation passed away, and the child soon after was taken from this city, in which the accident took place.

The piece of wood could always be felt distinctly in the palm, but only once, when in Panama, at the age of twelve, was its presence in the least degree annoying. When 22 years old, Miss T., then in Naples, caught hastily the falling top of a trunk, and in so doing bruised the region in which lay the splinter. Great local pain and slight swelling followed, but, growing better in a few days, left her with some uneasiness and discomfort in the part struck. After three months she began to have pain in the right shoulder, for which Dr. Suchet, of Paris, ordered liniments, regarding it as rheumatic. In May of the same spring of 1871, the pain in the hand grew worse, and in July it was severe in the median palm, thumb, and palmar face of the index-finger. At Plombiéres, in August, and later while travelling, it increased, and extending to the forearm assumed throughout a hyperæsthetic character, so that she began to guard the parts from foreign touch. It now became plain that the trouble was due to the splinter, and accordingly, at Milan, October 22, 1871, Dr. Sapolini, Surgeon to the King of Italy, assisted by Dr. Guerini, after a careful search removed the splinter, which is said to have lessened in size, is certainly smoother than it could have been at first when twenty years before it entered her palm. Dr. Sapolini, whom I had the pleasure to meet in Milan last summer, told me that it lay among the diverging median nerve filaments, and was taken away with great difficulty. On awaking from the chloroform sleep, she was at once conscious of intense

pain in the fore-finger and thumb. Within a few days the fingers contracted in firm flexion, the pain became exquisite, a touch was torture, and the median palm from time to time swelled and throbbed so as to induce the belief that pus had formed. Under poultices it would, however, subside, and in a few days go through the same process anew. The wound healed in a month, but thenceforward she lived under the influence of morphia, being almost entirely sleepless from the incessant pain and exquisite hyperalgesia which made the lightest contact a thing to be guarded against by precautions which seemed almost absurd. Despite the pain, a successful effort was made to straighten the fingers by the aid of a dorsal splint, and on its removal they remained straight or extended. The torment was worst on the thumb, median half of face of forefinger, the annulus, and the median palm close to the forefinger. It also extended on to the back of the hand, where it affected the dorsal surface on the radial side of the hand, and especially the last two phalanges of the second and third digits where the pain was no less than in front. Throughout all the regions named it was a constant burning pain, with red and smooth surfaces upon which the fall of a bit of lace or a veil edge was simply anguish.

In this condition Miss T. went from one well-known physician to another, the pain passing up the forearm and involving its whole surface in a hyperalgesia which varied in degree and was accompanied with a disturbance of the local circulation in the limb, so that it was now intensely flushed and now pale in spots. The shoulder also continued to be painful, and associated neuralgias awoke in the right face and neck and even in the right foot.

The whole range of usual local and general therapeutic means failed to lessen her pain, although heat, cold, actual cautery, Vienna paste, hypodermic injections of morphia, blisters, electricity (induced currents) were employed in turn, with an endless list of others which I need not catalogue. At length, in November, 1871, Dr. Sapolini found, after the most careful study, that, while protracted pressure on the median nerve in the forearm caused only an increase of pain, pressure on the musculo-spiral, at first increased and by and by destroyed not only the pain but the sensitiveness so completely that the finger and thumb could be roughly handled both on their dorsal and palmar faces. Again and again he applied this test, and when fully convinced that he was not mistaken and that relief always followed the pressure, he cut down on the musculo-spiral nerve above the outer side of the elbow and removed an inch of it. Absolute ease at once followed this section, pain and sensitiveness alike disappearing, while, to the amazement of the skilful anatomist who operated, the loss of touch in the radial regions of the back of the hand was so slight that he doubted there being any loss, although a considerable amount of wasting in the extensors and an absolute wrist-drop showed that the muscular distribution of the nerve had suffered. The full extent of this loss I have not learned. It left for a time a hollow in the forearm, but within a few months (four or five) the arm regained its plumpness, and as to the lack of power in the extensors it was certainly slight in the spring of 1873, although at this time the pain was enough to so far inhibit movement as to make it no easy task to judge of the real amount of motility. As to the sense of touch being but slightly hurt anywhere in the hand by the section of the musculo-spiral, I have also the assurance of Miss T., whose curiosity led her to examine the part with care.

On the eighth day after the operation the pain suddenly returned. The

sensitiveness to touch remained somewhat lessened on the back of the fingers and thumb, and on the whole the torture was thereafter less extreme, but it was still terrible, and the associated sensations grew worse, so that, as I have many times seen in other cases, the whole skin grew irritable and the sources of torment multiplying, bright lights and sharp sounds increased the pain, sensitive spots were developed on the scalp, a thick crop of herpetic eruptions covered the right arm, neck, and face, while the general health began to fail despite the most careful and skilful efforts to sustain it. Something was due no doubt to the prolonged healing of the wound, which was interfered with by frequent abscesses, and at last at the third week by erysipelas.

After the failure to gain full relief from Dr Sapolini's well-considered operation, Miss T. consulted very many surgeons and physicians of distinction, but without obtaining any further good result. In August, 1872, after using by Sir James Paget's direction a long series of hot water arm-baths, Miss. T., by his advice, returned to America. In January, 1873, I saw her in New York, and in the middle of February she placed herself under my care in Philadelphia, where, with the kind aid of my friend Dr. Wm. W. Keen, I made the following notes of her case.

At this time, with no notable functional trouble, Miss T. was thin and weak and singularly liable to sudden flushes or as sudden pallor. She slept with the hand propped upon its ulnar edge, and awakened many times at night when it fell over or was touched by the bedclothes, while all day long she devoted herself to the task of shielding the part from every foreign contact. This anxiety to avoid having the hand touched, and the constant influence of pain, gave to her physiognomy a singular expression of suffering and vigilance, such as I have rarely seen since the terrible traumatic neuralgias of the late war.

The arm presented numerous marks due to the use of cauteries, and on the palm at the edge of the thenar eminence was the scar of the operation for removal of the splinter, and above the elbow was the cicatrix left by that of the nerve section.

Motility.—Miss T. can use the deltoid, and flex and extend the arm, but, if the movement be sudden or extreme, it causes pain in the shoulder and neck. She can slowly and with pain pronate and supinate the forearm. She cannot extend the wrist, but on its being extended can delay its fall, chiefly by using the radial extensors. Slight power to flex wrist. The first and second fingers have no motility; but she can stir the last joints of the other fingers in flexion and extension. Probably most of this lack of power is due to long disuse and the inhibitory power of constant pain. The future history proved this view to have been correct.

Sensation.—This was examined by nerve regions. Touch and power to localize or place a touch are normal in the musculo-cutaneous distribution. Touch is well felt above scar left over the point of section of the musculo-spiral. Touch just below the scar is badly felt, and is referred above the scar. The radial and median sensation in the arm is normal, as well as that of the internal cutaneous nerve. In the radial area on the back of the thumb and first and second fingers touch is referred correctly, and is everywhere felt; but thoughout this region every touch is felt as both touch and pain. In a less degree this is true of certain parts of the whole arm, and most notably of parts just around the scar of the operation on the musculo-spiral. The ulnar territory is in all respects healthy by compass points. The sensitiveness of the thenar eminence is not acute, but increases as we approach the index-finger. The hyperalgesia is exquisite in the face of the second

finger, and the radial side of the third finger; on the face of the thumb and the palm; over the first joint of the index. In these regions touch is so much more distinctively felt as pain that the degree of health of the power of touch cannot be thoroughly studied. The over-sensitiveness is worst in parts of the median and radial territory of the hand, better in the external cutaneous branches of the musculo-spiral, and normal in the ulnar and internal cutaneous.

The great nerve tracks are tender upon deep pressure, which, over the median and musculo-spiral above the scar, causes increased pain in the hand. The axillary and brachial plexus are also tender, as well as the three upper cervical vertebræ. At times the surface of the right chest is sore, and also the teeth of the right side of both jaws, the teeth being themselves sound.

Secretions.—The median palm sweats incessantly, and the odour of the perspiration is very acid and heavy.

Nutrition.—The measurements of the two arms are as follows:—

Left forearm	8¾ inches
Right "	8 "
Left arm biceps	9¾ "
Right "	8 "

There is at this date no especial wasting of any of the forearm muscles, and no remarkable want of muscular tone. The interosseal groups are not wasted.

The two little finger nails are normal and alike, the second finger and thumb nails on the right hand are curved laterally, that is, singularly arched. The right index nail is $\frac{5}{16}$ inch broad, that of the left $\frac{7}{16}$ inch. She thinks there has been no difference in the rate of growth. The general tint of the right hand is livid, and the arm is liable to sudden alternations of feeling as to temperature, while the slightest irritation causes at first intense paleness followed by definitely limited islands of deeply flushed skin. The skin of the thumb and index-finger is rough, ragged, and marked with yellowish patches of loosened epithelium.

Temperature.—I made, at this time, an effort to ascertain the temperature of the affected parts, but totally failed, owing to the sensitiveness of the surface being such as to forbid the mere touch of the instruments.

Galvanism.—The forearm and hand muscles all reacted rather feebly under induced currents, but this was possibly due in some degree to long inaction, and she could not endure a severe use of the battery. The effects of galvanism were most interesting, and such as at first to induce me to believe that the constant current might prove of curative value. A current of at least ten cells *in either direction* along the track of the median nerve rendered the fingers nearly altogether free from over-sensitiveness, and enabled me, while the current passed, to ascertain that the sense of touch in these parts was but slightly impaired. This experiment was made again and again with the same result, and satisfied me that the nerve could not be very gravely altered. I am not aware of any like observation elsewhere recorded. I may add that the influence was limited to the median, and that continued galvanic treatment failed to relieve, except at the moment, and this is in accordance with all my former experience of traumatic neuralgia.

A long and careful study at last satisfied me that the cause of trouble lay in the disordered filaments of the median nerve in the hand, and that the effects exterior to this part were probably due to disturbances of the sensorium, propagated from the hand and resulting in associated neuralgias,

such as are commonly but inaptly termed reflex. One question remained to be answered, How far up the median nerve had the organic changes travelled. To this I could give no positive reply, since the whole nerve was tender, and there might possibly be a sclerotic condition of the entire nerve up to its spinal origin; but in this case I should have expected to find the muscles less sensitive to induced currents and the tactile sense greatly disturbed, which was not the case; I therefore determined to take the risk and divide the median nerve. At this stage Dr Brinton saw the case, and, in consultation with Dr. Keen, we determined to operate on the forearm below the point at which the motor filaments are given off to the forearm muscles. The only loss would thus be the sensibility of the median territory in the hand and the mobility of certain thumb and interosseal muscles. I add here Dr. Brinton's account of the operation, which was done by him with the assistance of Drs. W. W. Keen and Wharton Sinkler.

"March 2d, 1873, I first ascertained precisely the margins of the flexor carpi radialis and palmaris longus muscles by extending the hand upon the forearm. I then made an oblique incision 2½ inches long, from over the border of the first to that of the last-named muscle; the lower end of this incision terminated two inches above the line of the wrist-joint.

"The superficial fascia and the muscular aponeurosis were next divided on a director in the line of the cut. The tendinous edge of the radial flexor and the narrow tendon of the palmaris were thus exposed to view. I then sought for the median nerve in the inter-muscular space, and uncovered it at the lower end of the cut, just at the point at which it emerges from beneath the oblique fleshy fibres of the flexor sublimis digitorum; with the end of the finger this muscle was then raised from its bed (without laceration of its fibres) as high as the upper end of the incision. The median nerve was thus completely exposed for an extent of 2½ inches.

"It was decided by Dr. Mitchell that the removal of three-quarters of an inch of the nerve would be sufficient for the object of the operation; and this length of nerve was accordingly excised with the scissors. It was at the same time suggested, that, to diminish the probabilities of reunion of the divided nerve ends by fresh nerve development, the lower exposed end of the nerve trunks should be turned in a transverse direction into the surrounding tissues and there fixed. This was accordingly done, the nerve end being retained in its new position by a wire suture, which was removed at the expiration of forty-eight hours.

"The portion of nerve thus excised commenced below the origin of the muscular and anterior interosseous branches, and terminated above the origin of the palmar cutaneous branch. There was no bleeding; and no ligatures were required. The wound healed in about ten days."

The nerve ends retracted at once to such an extent that, although but three-quarters of an inch were taken away, the separation was found to be an inch and a half, and this became fully two inches and a quarter, when, at my suggestion, the lower end of the nerve was doubled on itself. The nerve looked healthy; and the piece put in Muller's fluid was studied within a few hours by Dr. Bertolet, whose statement I append. A hypodermic injection of morphia was given; this drug caused alarming prostration, while chloral produced the wildest excitement. The wound was painful; and on the third day, in this, as in Dr. Sapolini's operation,

erysipelas came on. It involved the lips of the wound first and thence journeyed to the finger tips and up the arm and over the right side of the chest. During this period of eight days I tried and gave up in turn many forms of narcotics. From this time the case progressed favourably, needing no treatment save tonics and a bountiful diet. A few hours after the operation I made an examination of the limb as well as the pain in it permitted, and found that the palmar face of the thumb and index were insensible, and could be touched without any annoyance, but hyperæsthesia still existed in the radial territory. On the sixth day there were acute pains in the index and thumb, due, I suppose, to the changes in the centric end of the cut nerve. On the sixteenth the hand and arm admitted of a careful study, and we found the following condition :—

Motion.—The relief from pain enabled her to move all the muscles save those damaged by the section of the nerve. The flexor tendons tied fast by the cicatrization of the wound, yielded to carefully conducted passive motion, and we shortly learned that the extensors and flexors were in nearly equally good order, but that in the thumb and index there were subacute joint lesions, which promised for a time to limit the range of motion. The section of the median nerve disturbed no muscles save those of the thenar eminence and the median interosseal groups ; but as one of the short adductors of the thumb is fed by the ulnar nerve, there yet remained the power to approximate the thumb and fingers

Sensation was absolutely lost for *touch* and *pain* on the palmar face of the thumb, index, and up to an irregular line on the radial side of the centre of the same face of the third finger. It was not lost on the palm though slightly lessened, but was absent on a part of the dorsal ends of the second and third fingers. Beyond these regions, as I shall further describe, touch was dulled over a much wider range. The area of absolute loss of feeling is seen at a glance in the accompanying diagram. It was traced again and again with the most sedulous care, and each time recorded on diagrams which were found to agree. With no less care I studied the sensory condition of the radial region. At first it presented the hyperæsthesia which had never left it since eight days after the operation on the musculo-spiral, but from the date of section of the median this very rapidly lessened, and within a month was but trifling. The sense of touch in this region was perfect.

The associated neuralgias and the tenderness of the nerves faded with equal rapidity, and thus within ten days, except the relics of radial sensitiveness, there was absolute freedom from every form of pain.

Nutrition.—The acneous eruption passed away with the pain, and a marked and steady change for the better took place in the colour and vascular state of the limb.

All the nails of both hands were stained on the day of the nerve section. Those of the left grew steadily at the rate of about 1 mm. a week. *None* of the nails on the right hand grew until the 14th day, when all grew at equal rates.

Temperature.—The sensitiveness before the operation, and the erysipelas after it, unfortunately interfered with my earlier thermal studies.

14th day. No erysipelas, wound healed.

10 A.M.	Right median region	96.5
	Left " "	91.5
9 P.M.	Right " "	96.4
	Left " "	92.5

16th day. Erysipelas again appeared on the right shoulder, but faded in two or three days after a fevered and restless night.

Right median thumb	92.4
Left " "	95.3

19th day. Patient well.

5 P.M. on 1st joint of index; Right median nerve region .	97.6
Left " " " .	94.

23d day.

Ball of thumb; Right median nerve region. . . .	93
Left " " "	92
Right index	93.5
Left "	90

A few days later I awakened a subacute arthritis in the metacarpo-phalangeal articulation of the right forefinger by making too extreme movement. The trouble proved obstinate, and exacted long rest on a splint with repeated counter-irritation by strong solutions of nitrate of silver; but this was the sole drawback, and ever since the hand has continued to improve in motion, while there remains the most absolute freedom from pain.

On the 20th Nov. 1873, ten months after the operation, Miss T. came to Philadelphia again, and gave me a chance to study the peculiarities of her condition at this time.

The forearm muscles *all* responded readily to moderate faradic currents. The essential thumb muscles in the thenar eminence moved under no form of electric stimulus, faradic or galvanic, save the short ulnar adductor, which being fed by the ulnar nerve responded to both currents. The ulnar interossei acted well; the median hand muscles of like groups did not respond to any electric irritation.

Sensation.—The study of the sensations proved very interesting. I give the simple details, reserving my comments.

The diagrams of lost touch and pain, made within a month after the section, remain much the same, except that on the median side of the third finger, first and half of second phalanx, touch can now be dully felt. The area of the palm in which touch was marked as lessened, is much as at that date; perhaps has somewhat bettered.

The dorsal regions of lost pain and touch remain as in the diagram, except that on the outside of the thumb there seems to have been some gain.

The ulnar half of the third finger palmar face feels light touch throughout, and correctly refers it, but is incapable of discerning as two the compass points at any distance apart. To my surprise the radial half of the fourth finger, though feeling a touch everywhere, is also unable to discern compass points as two at any distance apart. The ulnar side of the palmar face of this finger is more sensitive near the end; last phalanx the points are felt as two at $\frac{3}{4}$ of an inch apart; on the sound side as two at $\frac{1}{4}$ of an inch asunder. The fifth finger gives the same response on both sides of the body, but the patient insists that there is a difference in feeling in favour of the sound side.

There is absolute freedom from pain.

The nails grow alike. The thumb muscles are atrophied.

Remarks.—The trouble in this case began when the point where the splinter lay was struck. It is difficult to say what was the nature of the process then set up, but it was certainly irritative in character, and was

suddenly made worse by the operation in which the foreign body was removed. The hyperæsthesia and burning pain; and the contraction of the fingers make it probable that the trouble was inflammatory. The after-consequences were most interesting and instructive. The phenomena of pain and hyperalgesia, at first limited to the median nerve, as usual began to bring about in the sensorium a state of morbid irritability in closely related groups of ganglionic nerve cells, so that the musculo-spiral was next affected, and this, as I have said, through the sensorium; next other centres felt the same influence, and the irritative radiations inward from the diseased median so morbidly altered other and remoter sensation centres, as to cause these also to express pain, and thus to give rise to associated neuralgias of the shoulder, neck, face, and leg, the influence being throughout purely unilateral. When the nerve was divided, the centres were at once relieved from this steady afflux of morbid impressions, and rapidly regained their healthy states, with the exception of those from which arises the musculo-spiral nerve, the radial filaments of which still remain slightly over-sensitive, but are also improving.

In many cases I have traced these associated sensations to a passage upwards of the condition of neuritis or sclerosis, which came at last to invade other nerves of the parent plexus. At present, I believe that I should incline to charge a greater number of these secondary neuralgic and other changes to this singular condition of the centres of sensation, which, under the influence of constant irritation, propagates, from one set of ganglia to another, a growing tendency to evolve pain and other phenomena in the nutritive sphere. We have thus developed at last in the sensory centres a state which elsewhere I have described as being the exact analogue of what strychnia causes in the motor centres. Given such a state of things, and the sensory centres not only feel as pain influences which are not usually productive of pain, but also within themselves originate, as it were spontaneously without new irritations from without, the condition called pain. As yet we know of no drug which can bring about this state of the sensory ganglia, as strychnia causes a like state of the motor organs.

The ease for a time given in all the nerve regions involved by Dr. Sapolini's section of the musculo-spiral must, as I think, have been due to some influence which it exerted on and through the related groups of nerve centres.

In facial neuralgias not traumatic, I have frequently observed that the fits of pain in the infra-orbital could be temporarily bettered or checked by pressing upon the supra-orbital, or that pain in the infra-maxillary could be controlled by hard pressure on the supra-orbital. Sometimes, as I saw to-day in a neuralgia of the jaw in a toothless man, the slightest pressure anywhere on the gum will relieve the pain which talking or swallowing evolves. A sudden impression thus made at any point more remote might

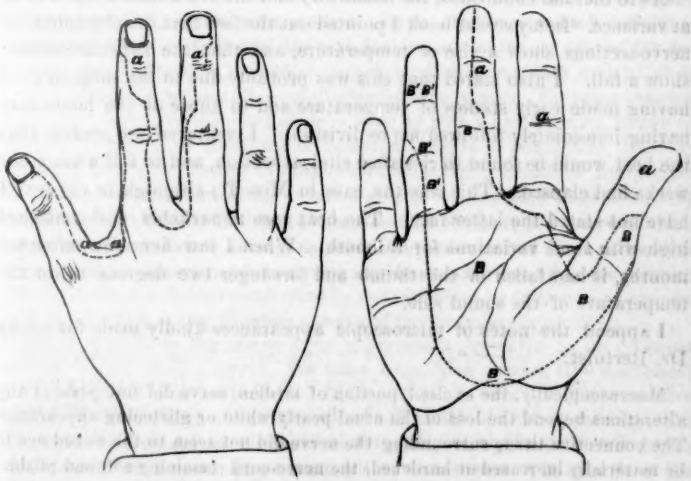
effect a like object. Thus, I am sure that I have seen pain in the brow disappear for days on the removal of a sound tooth, which was not really the agent in creating the pain, and I am disposed to explain thus many of the reliefs or cures of neuralgia by pulling teeth.

Section of the musculo-spiral is said, by Dr. Sapolini, not to have destroyed the sense of touch or pain anywhere in the radial territory of the hand, and if the patient and the operator were not deceived, this is to be attributed to the remarkable manner in which the nerves run over into the territories of their neighbours, and possibly to some variation in the normal supply. The part in question remained unaffected as to feeling by section of the median, so that the repair made *ad interim* must have been very complete.

The usual muscular distribution of the radial to the extensors certainly suffered, but as there is to-day full power, and as the early and marked atrophy has passed away, I conclude that the lost inch of the musculo-spiral has been restored most remarkably. Errors as to sensation may readily be made, but surely none could be as to the palsy and atrophy of the extensors, while also it is well to remember, that although the hand nerves run over, as it were, into one another's territories, the muscles are more constantly supplied by single nerves, and have a far less irregular distribution.

In studying the areas of lost sensation in this most valuable case, I shall first consider the case of touch. Fourteen days after the operation it was as shown in Diagrams 1 and 2. In November, 1873, it had changed but

Fig. 1. Fig. 2.



a. Pain and touch lost. *B*. Touch lessened. *B'*. Touch slightly lessened.

little on the dorsal aspect, while on the palmar face it had altered somewhat, so that, in certain portions of the thumb and third finger, a touch was felt in November where in February it was not.

Perhaps it may be said that the local shock may have been the partial cause of the more complete loss in February, but the change was slight. Something may be due to the greater attention paid to the region of dulled sensation, owing to which the sensorium became trained up to the perception of impressions which at a former period could not be felt at all. The loss of touch and pain was entire in the regions marked.

In a part of the palm, as indicated, pain was not notably less, and touch was slightly lessened, as measured by compass, for in all of the palm marked B, the lightest impact was felt. So also of the touch in the third digit, ulnar side, and all of the face of the fourth. These facts are of interest because the region of the greatest loss, dorsal and palmar, by no means corresponds to the anatomical descriptions and drawings, which either allow us to suppose the distribution to be symmetrical, or delineate it in diagrammatic lines which do not correspond either to the results in this case or in others. The innervation beyond the radial side of the third finger is also seen to be disproportionately small.

In Miss T.'s case there is, too, some loss of function in the ulnar side of the fourth finger for which we are hardly prepared by the usual descriptions.

I had hoped to learn, from this case, whether nail growth is checked by nerve section. Unluckily the facts prove too much, since neither in the ulnar, radial, nor median territories did they grow for some time. Moreover, the presence of erysipelas may have influenced the nail growth.

As to thermal conditions, the laboratory and the clinic have seemed to be at variance. In my recent book I pointed out the fact that the physiological nerve-sections show a rise of temperature, and that the surgical sections show a fall. I also stated that this was probably due to the surgeon's not having made early studies of temperature and to those of the laboratory having immediately followed nerve division. I ventured to predict that the heat would be found to rise after clinical section, and to fall when some weeks had elapsed. This was the case in Miss T., although in the text I have not stated the latter fact. The heat rose remarkably, and continued high with some variations for a month. When I saw her anew, after ten months, it had fallen in the thumb and forefinger two degrees below the temperature of the sound side.

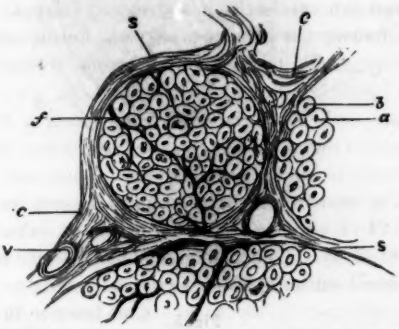
I append the notes of microscopic appearances kindly made for me by Dr. Bertolet.

Macroscopically, the excised portion of median nerve did not present any alterations beyond the loss of the usual pearly-white or glistening appearance. The connective tissue surrounding the nerve did not seem to the naked eye to be materially increased or hardened, the nerve-cord remaining soft and pliable. The nerve was hardened for section by being allowed to remain for several

weeks in a dilute solution of chromic acid. The whole nerve was then imbedded in wax, and transverse cuts made; these were then stained in Tiersch's neutral carmine solution; the water was then abstracted by placing the cuts successively in alcohol and absolute alcohol. They were finally rendered transparent in the oil of cloves, and permanently mounted in Damar varnish.

For the sake of comparison and in order that the description of the alterations presented might be readily understood, we have given in Fig. 3 the micro-

Fig. 3.



Cross-cut of Fasciculi of a Normal Radial Nerve.—*a*. Dark spot representing the axis-cylinder surrounded by the hyaline mass or white substance of Schwann. *b*. Medullary sheath or membrane of Schwann. *s*. Sheaths of the secondary fasciculi. *f*. Trabeculæ of connective tissue subdividing the fasciculus. *c*. Loose connective tissues in which are seen, *v*, sections of the bloodvessels.

scopic appearances presented by a normal radial nerve in the cross-cut when prepared precisely by the same method. In the cross-section each individual nerve-fibre exhibits an external ring with double contour, the cut edge of the medullary sheath, nearly in the centre of each circle is seen a dark spot, which is readily stained by carmine; this constitutes the axis-cylinder. The space between the axis-cylinder and the outer circle is filled up with a hyaline mass, known as myeline or the white substance of Schwann. Septa of connective tissue, as shown in the figure, stretch inwards from the investing sheath or neurilemma of the nerve-trunk and divide it into a greater or less number of secondary nerve-bundles or fasciculi. In the cross-section these septa are seen as thick rings, which are united among themselves by more or less loose connective tissue *c*; in the latter are seen coursing the bloodvessels supplying the nerve *d*. The fasciculi are further subdivided by delicate fibres or trabeculæ of connective tissue which spring from the sheaths of the secondary fasciculi

Fig. 4 represents the microscopic appearances presented by the cross-cut of the excised median nerve; the same magnifying powers (180 diameters) being employed as in the preceding figure. It will be seen that the connective tissue of the sheathing of the fasciculi as well as the interfascicular trabeculæ are slightly increased in thickness and quantity, though not to that degree which marks the hypertrophy attending chronic neuritis. The sheaths of the fasciculi have no longer the distinct fibrillated appearance of the first prepa-

ration, but merge into the connective tissue in the vacuity. The individual nerve-fibres themselves, however, present the principal changes. In very few of the rings of the secondary fasciculi, even with the higher powers (*vide* Fig. 5),

Fig. 4.

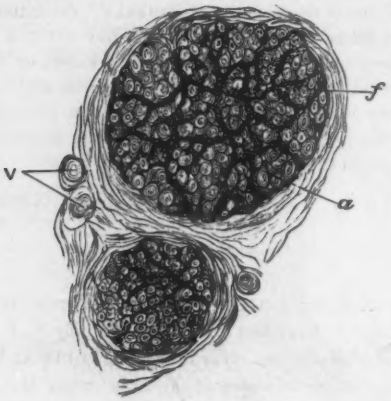
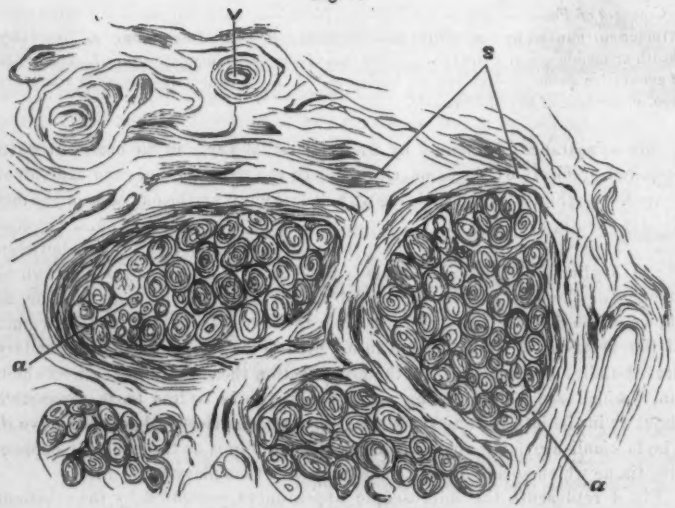


Fig. 5.



FIGS. 4 AND 5. *Cross-cut of Fasciculi of the Median Nerve, exhibiting the Lesions of the Wallerian Degeneration.*—*a*. Confused outlines of the nerve-fibres, concentric arrangement within the circles; scarcely any axis-cylinder to be seen. *s*. Sheaths of the fasciculi. *f*. Trabeculæ of connective tissue, moderately thickened. *v*. Bloodvessels, unaltered.

can the axis-cylinder be satisfactorily recognized, nor is it stained by the carmine. The circles of the individual nerve-fibres are no longer clearly de-

fined; they are seen as a confused mass of concentric rings. The myeline is more highly refractive than usual; fresh sections of the nerve, made shortly after its removal, afford a decided play of colours under the polariscope; this property, however, has been destroyed by the process of hardening and mounting employed. Longitudinal sections of the altered nerve revealed a slight increase of the nuclei in the sheaths of Schwann; the latter were no longer homogeneous, but granular and coarsely striated.

The lesions presented in this specimen are those known as Wallerian degeneration; the disintegration and atrophy occurring primarily in the nerve-fibres themselves, while in chronic hyperplastic neuritis the disintegration and atrophy result from the pathological changes occurring primarily in connective tissue framework supporting the nerve-fibres.

ART. II.—*Case of Exsection of the Brachial Plexus of Nerves for the Relief of Painful Neuroma of the Skin.* By F. F. MAURY, M.D., Surgeon to the Philadelphia Hospital, and LOUIS A. DUHRING, M.D., Clinical Lecturer upon Diseases of the Skin in the University of Pennsylvania. (With a wood-cut.)

UNDER the name of Painful Neuroma of the Skin, one of us (Dr. Duhring) reported in this Journal for October, 1873, a case remarkable for its many peculiarities. In that report the subject was discussed from a dermatological point of view only; in the present communication the question will be considered in its surgical aspect, as to the means of affording relief to the excruciating sufferings of the patient.

When first described, the case was deemed to be a unique example of disease, and, after further investigation, there appears to be no reason to question the accuracy of that belief. It seems to stand alone in literature, with its distinctive symptoms, apart from all other cases to which, at first glance, it might be likened. To thoroughly comprehend the affection it is essential that its whole course be carefully investigated in all its details; for, without accurate study of the various symptoms, viewed subjectively as well as objectively, it is impossible to arrive at a just appreciation of its nature. In the number of this Journal just referred to will be found an accurate representation of the disease, as well as certain statements which should be borne in mind.

In addition to the remedies already stated to have been tried, electricity and galvanism have been used perseveringly with no perceptible amelioration of the symptoms. Quinia has also been administered, both in tonic as well as in larger anti-periodic doses, without benefit. Preparations of iron and arsenic, various quantities of the bromide and iodide of potassium, all have been administered in turn without effect.

The signal failure of all remedies, both constitutional and topical, led to the consideration of the propriety of resorting to a surgical operation for the relief of the unbearable suffering which the patient endured. It was thought that by this means only was there a chance of affording any relief. The question presented itself: What operation could be performed with this end in view? It will be remembered that the area of suffering extended over the shoulder, radiating to a certain extent to the integument of the thorax anteriorly, and posteriorly to the scapular region, and down the entire arm, the central seat of pain being upon the arm at a point corresponding to the insertion of the deltoid muscle. It will be seen that a very large tract of surface was thus involved. After a careful study of the distribution of nerves to these regions, in which Dr. S. Weir Mitchell rendered valuable assistance, it was evident that to afford the best chance of subsequent immunity from suffering, it would be necessary to divide the entire brachial plexus of nerves; or better, to exsect a sufficient portion of nerve tissue to preclude any likelihood of reunion. It will be recalled to memory that the fourth, fifth, sixth, seventh, and eighth cervical nerves, together with the first dorsal, combine to form the plexus, these uniting by two main trunks or cords. During this investigation it was also found that the third cervical nerve supplied a portion of the integument of the neck and shoulder posteriorly; but it was seen to be entirely impracticable to divide this nerve by the same operation that would reach the brachial plexus at its most eligible and desirable point. It may be mentioned here that the only recorded case for which any operation has been instituted for a kindred, but not like disease, is that of Drs. Sands and Seguin, of New York, carefully reported in the *Archives of Scientific and Practical Medicine*, No. 1, 1873. The operation in this case, however, was done for a traumatic neuritis.

The free consent of the patient was obtained, after a clear and truthful statement of the risks and dangers had been made, and the operation determined upon.

On the 25th October, 1873, the patient was placed under careful surveillance, and the following notes recorded:—

7 A. M. Patient had three paroxysms during the night, and one after dressing this morning. They each continued from ten to fifteen minutes. 5 P. M. Has had six paroxysms since this morning's note, two of which lasted thirty minutes, two fifteen minutes, and the remaining two eight and ten minutes. Patient is fearful that the proposed operation will be of no benefit to him; nevertheless, is willing to risk death rather than continue to suffer.

26*th*, 8 A. M. Had three paroxysms through the night, one of which was very severe, and continued one hour; the others lasted each twenty minutes. 5½ P. M. Had two paroxysms to-day, fifteen and thirty minutes in duration.

27*th*, 8 A. M. Had two paroxysms during the night, and one this morning, of about fifteen minutes.

28th, 8 A. M. Five attacks of pain since last note, two of which, the patient states, were the most severe he has ever endured.

29th, 8 A. M. The day appointed for the operation. Five paroxysms since yesterday, three of which were very severe. 11 A. M. Is prepared for the operation. Is calm and in good spirits, thinking only of the pain that he may suffer after the operation. Has had two paroxysms within the last three hours.

The operation was performed by Dr. F. F. Maury, assisted by Drs. W. H. Pancoast, J. H. Brinton, and S. W. Mitchell, in the amphitheatre of the Philadelphia Hospital in the presence of the clinical class.

The patient having been thoroughly anæsthetized with ether, the following steps may be noted: The shoulders were well elevated, and the head allowed to drop backward with the face strongly inclined to the sound side, the integument of the neck of the affected side being thereby rendered tense. This is a point of importance, causing the sterno-cleido-mastoid muscle to be prominently displayed. It is, moreover, especially desirable that the posterior border of this muscle be clearly defined as a landmark for the first incision. The next important step consisted in rendering prominent the course of the external jugular vein, which commences in the substance of the parotid gland, upon a level with the angle of the lower jaw, and runs perpendicularly down the neck in the direction of a line drawn from the angle of the jaw to the middle of the clavicle. The finger of an assistant pressed immediately above the last-named point rendered this vein distended. The incision was ⌊ shaped, with the long arm extending along the posterior border of the sterno-cleido-mastoid muscle, beginning three inches above the clavicle; the short arm following the course of the collar bone, as in the operation for the ligation of the subclavian artery. The length of both skin incisions is to be regulated by the size of the neck of the patient. The knife was carefully guided, so that it divided only the skin, under which conspicuously appeared the external jugular vein; this was pulled aside by the finger. The handle of the knife and the finger were then used to tear and separate the fascia in searching for the tendon of the omo-hyoid muscle, the next important guide. Immediately underneath the posterior belly of the omo-hyoid muscle, which it was not necessary to cut, being readily held aside by the finger or a blunt hook, were found the two cords of the brachial plexus. The outer or upper cord, composed of a fasciculus from the fourth, with the fifth, sixth, and seventh cervical nerves, was elevated by means of a curved aneurism needle armed with a silk ligature; the needle was withdrawn, the ligature left and loosely tied around the cord, was given to an assistant. The index-finger of the left hand was then placed in the wound, and the exact position of the subclavian artery ascertained; it was found, and held well out of the way and carefully protected. The trunk was next divided with blunt-pointed scissors, as near the finger of the left hand as possible, which was effected without difficulty.

Another division was made above the point of the ligature as far up as practicable, care being taken not to interfere with the scalenus anticus muscle, across the body of which passes the phrenic nerve, which was not seen. By this means four-fifths of an inch of nerve substance, carefully measured *immediately* after exsection, was removed, and the marked retraction of the cut ends gave a space two and a quarter inches from each extremity. The inner cord was then sought for and found directly underlying the outer; this cord, it will be borne in mind, is composed of the eighth cervical and first dorsal nerves. It was secured by needle and

ligature in the manner already mentioned, and the same amount of nerve exsected. Even greater care should be observed here in the protection of the subclavian artery, as it lies in immediate proximity with the inner cord No vessels were divided, not even the transversalis colli, it being held carefully aside with the posterior belly of the omo-hyoid. The operation was therefore bloodless; no ligature was required.

The operation occupied one hour and a quarter, from the time of commencing etherization to the dressing of the wound. The incision was brought together, and covered with a pledget of oakum soaked with olive oil. The finger nails of both hands were stained with nitric acid, for the purpose of noting the growth of the nails. 5 P.M. Patient still more or less under the influence of the anæsthetic. The arm is completely paralyzed, and is without pain. 10½ P.M. Has had no pain since operation; is restless. One-fourth of a grain morphia given hypodermically.

30*th*, 7 A.M. Rested well through the night. Suffers no pain of any kind. 7 P.M. Has been comfortable through the day, and has eaten heartily. Ordered xl grs. bromide of potassium.

31*st*, 7 A.M. Slept well through the night until four o'clock, when he awoke and shortly after experienced a slight paroxysm of pain on the *top of shoulder*. It lasted five minutes, and was similar in character to the old pain. 4 P.M. Has been free from pain during the day; feels comfortable.

Nov. 1, 7 A.M. Just after getting asleep last night, he was awakened with pain about the top of the shoulder; it lasted fifteen minutes. Had slight pain an hour ago.

2*d*, 8 A.M. Did not sleep well; had a ringing sensation in his head. Complains of a tingling sensation in his arm. Slight paroxysm this morning. Wound of neck somewhat reddish.

3*d*, 7 A.M. Restless last evening; was ordered xxx grs. brom. pot., with ¼ gr. morphia. Was annoyed with pain three times during the night, but the attacks were light.

4*th*, 8 A.M. Rested well all night. While dressing this morning a paroxysm came on.

5*th*, 8 A.M. Had pain during the early part of the night, but slept comfortably during the night. Slight paroxysm while dressing wound. Stitches removed. Wound has united by first intention.

6*th*, 7 A.M. One very light paroxysm through the night.

7*th*, 7 A.M. Slept comfortably. One short attack of pain an hour ago.

8*th*, 7 A.M. Had one paroxysm during the night. It may here be observed that all the pain has been seated about the top of the shoulder.

11*th*. Still complains of the tingling sensation in the arm.

17*th*. Has been doing quite well, but has had one or two slight paroxysms during the twenty-four hours. The appetite is good, and he sleeps well. The finger nails have not grown at all upon the left hand (side of disease and operation), while on right hand they have grown an eighth of an inch. Strong tincture of aconite root was ordered to be applied as a continual dressing to the top of the shoulder.

24*th*. No relief has been obtained from the tincture.

29*th*. Is in good general health and spirits. Still continues to have one or two slight paroxysms through the day. The left forearm has been somewhat œdematous for several days past. It has been rubbed with an ammonia liniment, the unpleasant numbness and tingling in the part being greatly relieved by this means.

April 29, 1874. Since the foregoing notes were recorded, now five months, the patient has been under constant observation. During the month of January, a carbolic acid dressing, consisting of one part of the acid to three of glycerin, was applied to the painful shoulder. Vesication was produced, but without affording any relief.

May 12*th*. Within the past twenty-four hours the patient has experienced one paroxysm, which came upon him without apparent cause. He has also suffered four very slight attacks, all of them produced by external causes, as a draft of air, movement, nervous excitement, and the like.

13*th*. A repetition of yesterday's symptoms exactly.

The following table exhibits, in a condensed form, the state of the pulse and the temperature of the body before and after the operation. The temperatures were taken with great care, the portion of the bulb of the thermometer not in contact with the skin being surrounded and protected from the air by a piece of scooped out cork. The thermometer was allowed to remain in position from ten to fifteen minutes.

"Pulse and Temperature," degrees Fahr. before Operation.

	Pulse.	Temperature.				
		Left axilla.	Right axilla.	Left palm.	Right palm.	Surface of left shoulder.
1873.						
Oct. 25th, 7 A. M.	68	98⅘	98⅘	96		
" 25th, 5 P. M.	80	97⅘	97⅘	94		
" 26th, 8 A. M.	70	98	98	95		
" 27th, 8 A. M.	76	98⅗	98⅗	95		
" 28th, 8 A. M.	80	97⅘	97⅘	94		
" 29th, 8 A. M.	80	97⅗	97⅗	94	94⅗	
After operation.						
Oct. 29th, 5 P. M.	80	100⅘	98	99	91	98½
" 29th, 10 P. M.	88	101⅗	100	100	97	100⅘
" 30th, 7 A. M.	92	99½	98	98½	98	99
" 30th, 7 P. M.	80	100½	99½	99½	98½	97½
" 31st, 6 A. M.	76	98⅗	97½	97½	96½	96½
" 31st, 4 P. M.	80	99½	98½	99½	98½	97½
Nov. 1st, 7 A. M.	76	98	97½	97	96½	96½
" 1st, 5 P. M.	80	99⅘	98½	98½	96½	99½
" 2d, 8 P. M.	80	99	98½	97½	97	97½
" 3d, 7 A. M.	84	98½	97½	97	96½	95⅗
" 5th, 7 A. M.	76	97⅗	97½	96½	96½	
" 6th, 7 A. M.	72	98	97½	97½	96½	
" 9th, 7 A. M.	80	97½	97½	97	96½	
1874.						
April 29th,	96	99½	99½	94½	99½	
May 2d,	...	...	95½	92½		
" 3d,	...	...	97½	87½		

The thermal observations here given settle conclusively the mooted points as to the effect in man of nerve sections on temperature. They coincide

strikingly with the results obtained by Dr. Weir Mitchell in a case of section of median nerve (see present No. of this Journal), and again fulfil the prediction made on this subject by the above-named author.[1]

Before the operation and section in our own case, the left palmar temperature ranged from 94° to 96° F. It rose within three or four hours after the section to 99° F.; at 10 P. M. it was 100°, and up to Nov. 9th was never, save once, as low as 96⅜°, being usually a degree or more above that of the right palm. When again in April the temperature was taken it was, at 8 P. M., after a period of some pain and re-excitement; left palm 94¼°; right palm 99⅛°. Upon May 2d it was even lower; left palm 92¼°; right palm 95¾°; and the following day the left palm was only 87¾°; the right do., being 97¼.

The result of the operation may be summed up as follows: Our patient suffers but one painful paroxysm, and some four slight attacks of pain, in the course of the twenty-four hours. This statement may be received as an average of his sufferings since the operation, and the symptoms appear to be neither abating nor increasing at the present time. The general health is excellent. As a rule he sleeps quite comfortably through the night, now and then awaking from an attack of pain.

The muscles of the shoulder are conspicuously wasted, that of the deltoid being most notable, so that the head of the humerus has dropped at least an inch out of the glenoid cavity. The great and general œdema of the whole limb masks the lower atrophies in the forearm; but on removing the œdema by a bandage the muscle-losses become plain, as well as the bone-like hardness of their contracting tissues.

For two days after the operation an induced current of full power moved all the forearm muscles, but this capacity to respond declined by degrees, and at the fourth day a powerful galvanic current, interrupted and reversed, was needed to show them. The downward current acted best. April 29, no severity of any form of current moved the muscles, nor did they stir when galvanized through needles passed into their substance (75 cells), interrupted and reversed current.

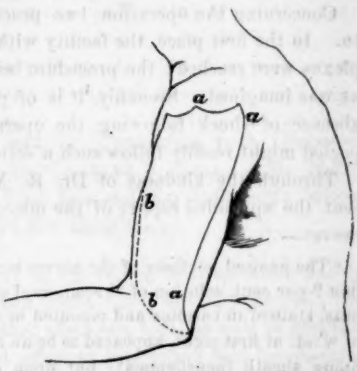
The skin of the arm and forearm is very dry and desquamates slightly. The fingers of the hand are all contracted, more or less, the third, fourth, and fifth most, partly owing to an old injury, but chiefly following the operation. The skin of the hand, especially about the knuckles, is reddish and smooth, accompanied with desquamation of the epidermis. There is marked incurvation of the nails on both sides (turtle-back nails), but especially on the left side, where they are very greatly curved. The difference in the growth of the nails is still very evident from the old staining; it is a difference of at least one-half.

As regards the appearance of the skin of the shoulder, and the nodules

[1] Injuries to Nerves, p. 177.

upon it, there is little change to note since the operation. It still retains its characteristics as described in connection with the history of the case, without any decided appreciable alteration.

A careful study was made by Dr. Perry, the hospital resident, of the region of lost sensation; and in April, Dr. Weir Mitchell and one of us (Dr. Duhring) repeated this examination, with no notably different results. Touch and pain, as tested by needle points, were absent in a region of skin which included all of the fore-arm and hand and face of the arm, bounded by an irregular line on the two sides, and above, on the front of the shoulder, by a still more irregular limit. The whole back and inner surface of the arm to the elbow was sensitive to touch and to the needle; but more so above than below. Even in the anterior arm space, where the needle entered painlessly, there were here and there regions in which distinct and well-localized pain was felt when Dr. Mitchell inserted needle points into the dermis, and transmitted through them the current of 50 to 75 Collat. cells. The wire brush on the dry skin yielded us no signs of feeling. The diagram gives an idea of the limiting lines which bound the areas of lost or lessened feeling.



The line *a*, *a*, *a*, on the outer surface of the arm, marks the boundary above and outside of which sensation is preserved. The *dotted* line *b*, *b*, marks the same for the *inner* surface of the arm.

No new tubercles have appeared on the arm, though several small new ones are observed upon the back, about the scapular region; they are the size of split peas, and as yet are only painful upon pressure.

When we consider then the state of our patient before the operation, and his present condition, there is every reason to feel gratified with the result; for although the suffering has not been completely removed, the relief afforded has been so great and so decided as to admit of no question. The patient himself bears frequent and willing testimony upon this point, stating that he is well satisfied with the success of the operation, and thankful for the ease obtained. He is now able to live in at least comparative comfort, whereas before he was in continuous pain, and this of so grievous a character as to be almost intolerable. The complete paralysis of the arm is of little moment to the patient, and is scarcely worthy of consideration in comparison to his previous sufferings; for the limb had not only to be guarded, but preserved as free from all movement as possible, the least exertion or motion being followed by paroxysmal

pain. We remark here, that absolute relief from pain was not expected from the division of the nerves operated upon; for, as is known, the third cervical nerve gives off branches which supply the skin of the top of the shoulder, which would still continue to exert its influence. The result has realized the views entertained upon this point previous to the operation. It is, without doubt, from the cutaneous branches of the third cervical nerve that the pain which the patient now experiences proceeds.

Concerning the operation, two practical points may be briefly referred to. In the first place, the facility with which the cords of the branchial plexus were reached; the procedure being by no means so difficult a task as was imagined. Secondly, it is of particular interest to note the total absence of shock following the operation, a condition which it was expected might readily follow such a serious systemic disturbance.

Through the kindness of Dr. R. M. Bertolet, we are enabled to present the appended report of the microscopic examination of the exsected nerve:—

"The excised portions of the nerves were, after the operation, at once placed in a 2 per cent. solution of chromic acid and hardened for section. Transverse cuts, stained in carmine and mounted in damar varnish, revealed the existence of what, at first sight, appeared to be an abnormally thick, hypertrophied enveloping sheath (neurilemma); but upon closer study, and on comparing with sections of the normal brachial plexus, it was evident that this apparent excessive development of the connective tissue sheath was no more than proportional to the increased size of the nerve trunk itself in this region.

"The connective tissue septa arising from the neurilemma, and subdividing the nerve trunks into secondary bundles, were scarcely, if any, more strongly developed than ordinarily; no marked proliferation of the connective tissue corpuscles existed. In the secondary fasciculi of the nerve, however, at many places were seen accumulations of young migratory cells ('granulation' of Virchow). The aggregation of these elements between the primitive nerve fibre was so great, at not a few points, as to press them widely asunder and lead to a corresponding atrophy of the individual fibres. The axis-cylinders were seen distinctly in every instance; the atrophy having taken place mostly at the expense of the surrounding medullary substance. The nerves that underwent these atrophic changes presented a very bright, highly refractive, glassy appearance under the microscope, strongly reminding one of amyloid degeneration, yet the iodine test failed to give any reaction; this if present, however, would not have responded on account of the preservative fluid employed. These bright spots occurred in circumscribed areas of the nerve bundles, while in the remaining portions the nerve fibres were unaffected; there having been just the faintest suspicion of commencing proliferation of the interstitial substance.

"In this specimen we do not have the same material growth of connective tissue, nor the attendant fatty metamorphosis, usually seen in marked cases[1] of *neuritis interstitialis;* yet the alterations found are sufficient to indicate that

[1] Virchow's Archiv, Bd. 53, p. 441.

this nerve has already fully entered the earlier stages of these inflammatory changes."

In conclusion, we desire to express our thanks to Dr. Mitchell for valuable suggestions offered, as well as for the interest manifested in the study of the case. For the careful attention to the patient, and for notes after the operation, our thanks are tendered to Dr. H. M. Perry, one of the House-Surgeons to the Hospital.

ART. III.—*Retinal Hemorrhage and its Connection with Cerebral, Cardiac, and Renal Lesions.* By CHARLES S. BULL, A.M., M.D., Assistant Surgeon to the New York Eye and Ear Infirmary; Microscopist to the Manhattan Eye and Ear Hospital.

RETINAL hemorrhage, or apoplexy of the retina, is an affection doubly interesting to the ophthalmologist and pathologist, not only intrinsically, but also from its connection with other affections, local as well as general. It is by no means a rare lesion, and offers an interesting field for observation and study, in respect of its causation and pathology.

Its causation is of a twofold nature; that is, the hemorrhage may have an intrinsic and an extrinsic origin. It may arise from disease within the eye, as neuro-retinitis, retinitis, or glaucoma, and is then said to be intrinsic in its origin; or it may originate in cardiac disease, chronic renal disease, or general disease of the vascular walls throughout the body. We occasionally meet with retinal hemorrhage in that obscure class of cases which we group under the head of the hemorrhagic diathesis, where there does not seem to be any particular disease of the vessels, and yet the patients suffer loss of blood from repeated hemorrhages from the mucous membranes and occasionally from the cutaneous surface. A sudden hemorrhage into the retina or vitreous humor, from the rupture of a retinal or choroidal vessel, may arise from some disease of the heart, or from an atheromatous condition of the coats of the vessels, or from chronic disease of the kidneys, and also, though rarely, from suppressed menstruation. When the hemorrhagic diathesis seems to be the predisposing cause, it almost always occurs in young persons, and there are generally multiple extravasations in the retina and vitreous humor. By the aid of the ophthalmoscope we can distinguish three varieties of hemorrhage, and some authorities say four. The first variety consists of small round spots or points, circumscribed or scattered over the whole fundus, though generally in the neighbourhood of a vessel. Secondly, we meet with longitudinal streaks or bands, and these are in the nerve-fibre layer. Thirdly, there occur larger, irregular masses, situated always near the large veins. The

fourth variety is a complete suffusion of the retina, a continuous extravasation of blood. These hemorrhages may be confined entirely to the retina, and this is usually the case; but it is by no means rare to meet with patients who complain of having lost their sight suddenly, and on examining the eye with the ophthalmoscope we get no reflex, and find the whole vitreous humor infiltrated with blood. It does not necessarily follow that this is the worst form of the disease, for the blood is generally absorbed, and some amount of vision at least restored. But in such extensive extravasations the blood generally comes from a ruptured choroidal vessel, showing that the trouble is not confined to the retina, but involves also the vascular tissue of the eye. Where the source of the hemorrhage is a retinal vessel, the extravasation always seems to show a greater tendency to extend outwards to the choroid than inwards towards the vitreous humor.

Apoplexy of the retina, having once occurred, shows a great tendency to recur, and where the recurrences are frequent, they may increase markedly the intraocular tension and give rise to hemorrhagic glaucoma. As an independent lesion, without any accompanying lesion of the tissue of the retina, apoplexy of the retina rarely occurs except in advanced life, most frequently after the fiftieth year, though it may accompany any form of retinitis at any age. Occasionally, though very rarely, it occurs coincidently with *purpura hemorrhagica*.

M. Ruc, in the "*Union Médicale*" for 1870, cites a case of retinal hemorrhage accompanying an attack of purpura hemorrhagica in a labourer, fifty years of age, who was an excessive drinker. Besides numerous spots of purpura upon the skin and mucous membrane of the mouth, the man had hematemesis, bloody stools, and numerous large hemorrhages into the retina, with marked disturbance of vision. In the right eye there was a hemorrhage into the macula lutea. Eight days later the spots of extravasation were darker, and in some there appeared small white spots. There was no albuminuria. The autopsy did not show any special changes in the organs, except the hemorrhages, and there was no change in the bloodvessels, as shown by the microscope. Some of the hemorrhages were in the choroid. There were some few fat granules in the tissue of the retina, but none in the walls of the vessels.

When these hemorrhages occur without any inflammatory action in the retina, they must be regarded as a sign of an anomalous state of the circulation, and an unfavourable prognosis is to be given.

Retinal apoplexy is ordinarily accompanied by a slight serous transudation into the tissue of the retina, which gives the latter an œdematous appearance. The prognosis is always more or less unfavourable, not so much on account of possible injury to the vision, as on account of its being a symptom of profound trouble elsewhere.

It often occurs simultaneously with lesion of the heart, and advanced general atheromatous degeneration of the walls of the bloodvessels, which

two morbid conditions are frequently the source of grave cerebral affections. The prognosis becomes still more unfavourable if it is a second or third attack.

When the retina itself is inflamed, then the walls of the vessels are involved. The extravasations in a retinitis are usually slight, but often very numerous. They are generally situated in the inner layers of the retina, but under the pressure of the blood they not unfrequently press into the meshes of its connective tissue framework. In this situation they appear columnar in shape, but near the papilla they are elongated. The frequent occurrence of extravasations in inflammation of the retina finds another cause in the swelling of the optic disk, from the nerve being involved, and the consequent venous congestion. Stellwag tells us that retinal hemorrhages occur not uncommonly in old people, particularly in those having a tendency to capillary hemorrhage of the brain. It is generally conceded that hypertrophy of the left ventricle of the heart increases the tendency to these hemorrhages.

And now, what are the subjective symptoms of a retinal apoplexy? Sometimes, though not very often, the patient may have some premonitory warnings of a faulty circulation, particularly if he is advanced in years. There may be attacks of vertigo and amblyopia, transient in duration, but recurring. But usually the hemorrhage occurs suddenly, and this is one of the most characteristic symptoms. The patient may wake in the morning and find that he is blind in one or both eyes, though usually the disease is confined to one eye, at least in the beginning. It may occur while he is pursuing his ordinary avocations, appearing as a dark red or black spot or ball before the eye, which rapidly extends and obscures the entire field of vision. Of course the impairment of sight produced by the hemorrhage depends on the extent of the effusion and its locality. There may be a single large clot, or a number of small ones. If the clot is a large one, the hyaloid membrane is usually ruptured, and the vitreous humor becomes filled with blood, and this is generally the case when the extravasation comes from a choroidal vessel.

Whether constitutional syphilis exerts any predisposition to retinal hemorrhage is by no means certain. Though inflammation of the retina is a not uncommon symptom in general syphilis, hemorrhages in this form of retinitis are not often seen, and though some authorities assert that syphilitic patients are very predisposed to what is usually called "retinitis apoplectica," their assertions are not sufficiently fortified by actual cases to be of very great value. The form of retinitis observed in constitutional syphilis is not usually of the exudative variety. The retina is swollen and œdematous and soon loses its transparency, but there is rarely anything more than a serous exudation. In a published account of clinical observations made at Wiesbaden for the years 1863 to 1866, Dr. Mandelstamm reports that among nine cases of syphilitic retinitis, there

were four of them accompanied by hemorrhagic extravasations, thus proving the assertion of some observers to be wrong, that apoplexy of the retina never occurs in syphilitic retinitis.

Retinal hemorrhages occur by far more frequently in men than in women, and also much oftener in patients over fifty years of age than under it. In the same report of Dr. Mandelstamm, just quoted, out of 26 cases of retinal apoplexy, 22 occurred in patients from fifty to eighty years of age, and 24 of the 26 cases were in men. Dr. Mandelstamm calls particular attention to the fact that the hemorrhages most frequently occurred in persons between seventy and eighty years of age, and thinks it by no means hypothetical to conclude that they are caused by atheromatous changes in the walls of the bloodvessels. In a report of the same institution at Wiesbaden for the years 1861 and 1862, Dr. Pagenstecher reports 19 cases of retinal apoplexy in two years, and calls attention to the fact that in many of these cases the amount of functional disturbance was comparatively slight, and by no means commensurate with the pathological changes as seen with the ophthalmoscope.

One of the cases was a robust man, thirty-three years of age, who had extensive hemorrhagic extravasations all over the surface of the retina, except at the macula lutea, and yet he read Jaeger No. 4 type, and had a normal field of vision. Five months later the hemorrhages were all absorbed and the patient read Jaeger No. 1 type. In this case there was no organic affection diagnosticated.

The connection of retinal hemorrhage with lesions of the brain, heart, and kidneys is one of very great interest, and at the same time is still somewhat obscure. Perhaps the greatest doubt has been thrown upon the statements of some writers, that the hemorrhages into the retina occurring in elderly people are to be regarded as a premonitory or precursory sign of cerebral apoplexy. Of course, the only way to confirm the statement is to tabulate a sufficient number of cases in which extravasations into the retina have been followed at a varying interval by cerebral hemorrhage. This has not been done, and from the nature of things would be difficult of accomplishment. As a rule, we are unable to keep our patients under observation for any great length of time; yet, with some care I am convinced we might, in time, collect some valuable statistics on this point. I have seen three cases in which retinal apoplexy was followed by cerebral apoplexy, and I have now under observation a fourth case, which I expect will follow the same course. The history of these cases will be given subsequently in detail. Dr. Allbutt, in his valuable work on the ophthalmoscope, says that in cases of large cerebral hemorrhage, where there has been retinal disease and chronic disease of the kidneys, there were usually seen small hemorrhagic extravasations about the optic disks, but considers that these may occur in patients without the danger of an attack of cerebral hemorrhage, and even when the patients do not complain of their vision.

Hemorrhage into the retina has been recorded in a number of cases of encephalic apoplexy, but Dr. Allbutt is not disposed to think that any pressure upon the recurrent vessels could cause a rupture of the retinal vessels unless they were diseased. But we know as an established fact that in all cases of cerebral apoplexy occurring in old people, there is always atheromatous degeneration of the walls of the vessels generally throughout the body, and of course the retinal vessels do not escape.

Dr. Berthold, in the *Klinische Monatsblätter für Augenheilkunde* for April, 1870, relates a case of a woman, between thirty-five and forty years of age, who came to him with the complaint of sudden loss of vision in the right eye, and on examination with the ophthalmoscope he found a hemorrhage into the macula lutea. As he was on the point of dropping in some atropia to dilate the pupil, so that he might examine the whole fundus more carefully, she suddenly complained of feeling unwell, fell back, and died in three-quarters of an hour with all the signs of cerebral apoplexy. Unfortunately there was no autopsy. Dr. Heymann, in the year 1864, in the same journal, relates a case of retinal apoplexy occurring two months after the vision commenced to fail; the hemorrhages were situated near the optic disk, were from the veins, and rapidly increased in size and number. One month after their first appearance came the first attack of unconsciousness and paralysis. Before this the eye had given signs of neuritis and progressive atrophy of the optic nerve fibres. The hemorrhages occurred in both eyes to about the same extent.

There were probably in this last case cerebral lesions at the base of the brain near the left ventricle. The first ophthalmoscopic sign visible was the engorgement of the retinal veins, due to some hindrance to the flow of venous blood. Subsequently the pressure became greater, as was proved by a double sign, narrowing of the arterial calibre and rupture of the veins. Then came the sclerosis of the connective tissue of the nerve and retina, and finally the signs of apoplexy.

Dr. Reynolds considers that clots in the retina are to be regarded as warning symptoms of a cerebral lesion, and after the age of forty, they point at least frequently to the danger of the patient dying of cerebral hemorrhage. Dr. Tanner also considers them as warnings of cerebral lesions, classing them with the sudden transient attacks of blindness and diplopia which are met with. Dr. Hammond says, in speaking of cerebral hemorrhage, that defects of sight may occur, usually characterized by the presence of dark spots in the axis of vision. These are due to minute extravasations of blood into the retina, and are always of most serious importance. He says he has known retinal hemorrhages to precede by more than a year the occurrence of a more severe lesion.

Dr. Colsman, of Barmen, has reported a number of cases of retinal hemorrhage in the *Berliner Klinische Wochenschrift* for February, 1870, some of which were followed by cerebral apoplexy. He draws particular attention to the fact that the retina is peculiarly liable to disturbances in its circulation, owing to its anatomical connections and anastomoses with

the vessels of the cranial cavity and jugular veins. This may either result in anæmia from hindrance to the arterial current, or in congestive hyperæmia due to pressure on the venous circulation from some cause within or without the cranium. Instances of the latter condition are by no means rare, such as swelling of the tissue of the optic nerve and retina from the pstauungs-papille" of Von Graefe, in which hemorrhagic extravasations into the retina are very common. Dr. Colsman considers that in a general fatty or atheromatous degeneration of the vessels, retinal hemorrhages are to be regarded as preceding or accompanying cerebral apoplexy. In those cases where there is no perceptible disease of the arteries, he thinks that an increased blood pressure in the cranial veins from whatever cause, is readily propagated to the retinal veins owing to the rich anastomosis of the ophthalmic vein with the cavernous sinus. We no doubt sometimes meet with cases in which there is apparently no cause for the retinal hemorrhages, and these are just the ones which require most minute and careful scrutiny. A rigid examination will usually establish some etiological connection between the state of the retina and some other organ or tissue in the body.

One of Dr. Colsman's cases was a very corpulent woman, without any organic lesion, who had suffered from repeated attacks of retinal apoplexy. His ninth reported case was one of repeated hemorrhages into the retina in a woman, sixty-two years of age. There were a number of small, bandlike hemorrhages all over the retinæ of both eyes, some recent, others which had undergone retrogressive metamorphosis. There was no other disease of the eyes, nor of any organ in the body which might cause these extravasations. The sight improved somewhat as the hemorrhages became absorbed, but the patient soon after died of cerebral apoplexy. His eleventh reported case occurred in a perfectly healthy man, forty-two years of age, who complained of periodically recurring and transient redness of the conjunctiva and dimness of vision of one eye. There was œdema of the retina and papilla of this eye and some delicate hemorrhages. The patient complained of severe headache, particularly after any bodily exertion. About three months later he died suddenly from cerebral apoplexy. All these symptoms pointed to an abnormal state of the cerebral circulation.

The following four cases were under the writer's own observation for a time, and as the various symptoms point to an intimate connection between lesions of the retina and lesions of the brain, the histories will be given somewhat in detail :—

CASE I.—A. P., aged sixty-three, English, married, a book-keeper, applied to me in 1871 for an affection of the right eye, of some fourteen months' standing. He complained of a suddenly occurring dimness of vision, coming on at irregular periods, lasting a varying length of time, though never more than a few hours, and always being more intense when it first appeared, and gradually growing better. He said he had always led an exceptionally temperate life, and was apparently in excellent health. On examining the eye there was nothing abnormal externally, but with the ophthalmoscope there were seen a number of small, punctate hemorrhages

all over the retina, and some two or three upon the optic disk itself. There was no œdema of the retina, and no large extravasation anywhere. The retinal veins were perhaps a trifle engorged. The other eye was perfectly normal. His heart was examined and found healthy, as were also the liver and kidneys, the urine having been repeatedly examined and nothing abnormal found. A closer investigation showed disease of the radial and temporal arteries. The patient said that he frequently felt a fulness in the head after a meal or after stooping, but that the feeling soon passed off. Being sure of the connection between the repeated retinal lesions and the cerebral circulation, I cautioned the patient to lead a very quiet life, avoid all undue muscular and mental exertion, and report himself from time to time. He was seen three or four times and then disappeared, and on going to inquire about him, I was informed that he had died from cerebral apoplexy, following a recurrence of the dimness of vision. The death took place about eighteen months after the first appearance of the retinal lesion.

CASE II.—R. H., aged fifty-four, Irish, married, a gardener, applied to me for a sudden loss of sight in the left eye, which had come on two days before, while working at his business. The patient was short and stout, of full habit, and had in former years been a hard drinker. He had suffered from vague rheumatic pains for years, but had never had any distinct attack of rheumatism. He said he had always considered himself a healthy man until this failure of his sight. On testing his vision, I found he could count fingers at about ten feet, and could just make out Snellen CC at three feet; the vision in the other eye was normal. With the ophthalmoscope there were seen three large hemorrhages in the retina, two in the course of the ascending vein, and one along the main branch of the descending vein. There was no œdema and no pulsation, and the other eye was normal. His heart was examined and found healthy, though it was beating much more rapidly than was normal, but this, he said, had been the case for years. The urine was repeatedly examined, but nothing could be found that pointed to renal disease. His arteries were slightly atheromatous, but not markedly so. The patient was seen from time to time, and occasionally some small fresh hemorrhages made their appearance in the retina. He died suddenly one night after running rapidly some distance, with all the signs of cerebral hemorrhage.

CASE III.—W. H. B., American, aged fifty-two, single, a lumberman, complained of a sudden attack of blindness in both eyes, which had come on about a month before. Since then the vision had improved somewhat, though it was still very dim. The patient had been a man of violent passions, a hard drinker, and, while in the army, had contracted a severe type of malarial fever in some of the swamps of the Southwest, from which he had never entirely recovered. The liver was considerably enlarged, occasionally painful, and he suffered habitually from dyspeptic symptoms. There was a loud, blowing murmur over the base of the heart, synchronous with the first sound. I could detect no disease of the kidneys, though there was occasionally some pain in the lumbar region. On examining his eyes the vision was found reduced to $\frac{20}{C}$, and the ophthalmoscope showed numerous hemorrhages in the retina of variable size and shape, most of them undergoing retrogressive metamorphosis. The extravasations were so numerous as to give a general brownish colour to the whole fundus. The patient was told plainly the condition of affairs and the danger in which

he stood, and was advised to return to his home in Wisconsin and lead a quiet life. This he promised to do, but I afterwards heard that he had become paralyzed, and died unconscious, probably from cerebral hemorrhage.

CASE IV.—Mrs. T. C. S., aged sixty-four, applied to me in February of this year for a failure of vision which had come on suddenly in both eyes, and which had gradually grown worse. On examination, vision with the right eye was $\frac{10}{CC}$, and with the left $\frac{20}{C}$. With the ophthalmoscope there were seen numerous large hemorrhages in the right retina, and incipient cataract. The extravasations were all in the course of the large retinal veins. In the left eye there were not nearly so many clots, and they were smaller than in the right eye. There was also an incipient cataract in this eye. The patient is of very full habit, short and stout, with chronic valvular disease of the heart, and a marked arcus senilis. She also suffers from chronic cystic catarrh and a femoral hernia of the right side. The urine has been examined carefully, and neither albumen nor casts have been found. The patient is still under observation, but I expect to hear of her death by cerebral hemorrhage, which may occur at any time.

It is a well-known fact that hemorrhage into the retina is a common accident in the advanced stages of chronic Bright's disease. Dr. George Johnson, of King's College Hospital, London, has advanced some interesting points explanatory of their causation, in the *Medical Times and Gazette* for July 2, 1870. In this disease of the kidneys, he says, the muscular walls of the minute arteries in most of the tissues, are much hypertrophied, owing to long-continued overaction. Excessive contraction of the minute systemic arteries impedes the onward movement of the blood, and calls for increased efforts on the part of the heart to carry on the circulation. Hence hypertrophy of the left ventricle. An obvious result of the struggle between the increased action of the heart and the increased arterial resistance is an increased strain and pressure on the arterial walls, and a consequent increased risk of hemorrhage from rupture of one or more minute arteries, such as we frequently meet with in a punctate cerebral hemorrhage. Dr. Johnson has observed in cases of Bright's disease with hypertrophy of the left ventricle, that, while as a rule the minute arteries in all the tissues have their muscular walls hypertrophied, the hypertrophy of the arteries of different tissues in the same subject is sometimes unequal. May not the hemorrhages into the retina and brain, that we meet with in these cases, be due to the fact that the increased propelling force of the hypertrophied left ventricle was not counterbalanced by an equivalent hypertrophy, and consequent resisting power in the minute cerebral and retinal vessels? Of course we must depend upon the microscope for solving the question whether the retinal vessels are hypertrophied or not, in cases of chronic Bright's disease, and, unfortunately, we are not very often able to get possession of the eyes of patients who have died from chronic renal disease. I was fortunate

enough, during the past summer, to follow up a case of retinitis albuminurica with hemorrhages, which I had seen in consultation. I was present at the autopsy, and got possession of one kidney, the heart, and one eye. A careful microscopic examination showed a very marked hypertrophy of the renal capillaries and small vessels of the heart, but the retinal and choroidal vessels were not much hypertrophied, though their walls were somewhat thicker than normal. This one case seems to go to support Dr. Johnson's views, but we need more cases. The situation of the hemorrhages in the retina which accompany retinitis albuminurica is somewhat different from the situation of retinal clots occurring in other forms of retinitis, though not always so; at least this is the conclusion I have drawn from my observations. We must recollect that in the class of cases now under consideration there is a pathological process going on in the eye, which if not always a strictly inflammatory one, yet always induces permanent destructive changes in the retina. We may say that there is always an inflammation of the retina present, the morbid process at first going on in the inner layers of the retina, anterior to and also involving the retinal vessels. There is always a degeneration of these vessels, and very soon the engorged and tortuous vessels rupture and extravasations of blood occur, partly in the form of fine, radiating streaks between the bundles of nerve fibres, partly in the form of larger oval or circular spots rendering it very difficult to recognize the smaller vessels. I have observed almost invariably that these hemorrhages occur around the posterior pole of the eye, or rather round the entrance of the optic nerve, and between the disk and the macula. They seem, as a rule, to have the form of the spokes of a wheel, radiating from the optic papilla as a centre. They occur most frequently in the advanced stages of the morbid process of the retina, after the outline of the papilla has become obscured, and the disk has become surrounded by a wall of brawny infiltration. On this wall small hemorrhages occur very frequently. There does not appear to be any particular period in the course of the renal disease at which these hemorrhages occur, though we are far more likely to meet with them at the period when the excretion of urine is more and more interfered with, consequent upon the atrophy of the renal tissue. Here the general circulation becomes more and more impeded, and the tension of the vascular system, augmented by the increased action of the hypertrophied ventricle, finally reaches a point where rupture ensues and extravasations occur. The blood does not always come from the larger vessels, though it sometimes does. *Hulke* says that he does not recollect an instance among the cases which he submitted to microscopic examination, in which the hemorrhage came from the larger vessels; it was always from the capillaries. The hemorrhages are usually in the inner layers of the retina, next the vitreous humor, though sometimes they infiltrate the whole thickness of the retina, and are even met with between the choroid and retina. In the case mentioned

above, in which I was fortunate enough to obtain the eye for examination, the extravasations in the retina were all in the nerve fibre and internal granule layers, but there were two or three clots in the swollen tissue of the optic disk, and quite a large one in the tissue of the nerve itself, just in the region of the lamina cribrosa. In this case the extravasations came from both large vessels and capillaries. Another point which I have observed in cases of retinitis albuminurica, is that retinal hemorrhages scarcely ever occur unless there is at the same time organic disease of the heart. They do occur sometimes where there is no cardiac complication, but this is not often the case. During the past three years I have had the opportunity of observing eighteen cases of retinitis associated with renal disease, and from these cases I have drawn the above conclusion.

The first case was a man, 30 years of age, who had all the symptoms of chronic Bright's disease, with affected vision in both eyes. The ophthalmoscope showed infiltration of the retina at the macula lutea, round the optic nerve, and between the nerve and the macula, and at the periphery near the ora serrata, there were patches of choroidal atrophy. Between the nerve and the macula in each eye were a number of longitudinal hemorrhages, always more superficial to the peculiar yellowish-white, glistening exudations. This man had hypertrophy of the left ventricle of the heart, with chronic valvular disease. He had moderate œdema of the face and extremities, frequent attacks of uræmic amblyopia, and marked dyspnœa. The urine contained albumen and fatty casts.

Case second was a man, 32 years of age, who had, when first seen, the peculiar stellate exudation round the macula and a brawny infiltration of the optic papilla, with a few small thread-like hemorrhages round the nerve entrance and upon the disk. Three weeks later he complained of being entirely blind in the left eye, and on examining him with the ophthalmoscope, the whole vitreous humor was found opaque, probably from a large hemorrhage, which completely concealed the fundus. This man had a tremendous rough, blowing sound at the apex of the heart, synchronous with the first sound, with marked hypertrophy. His urine contained albumen and granular casts.

Case third was a woman, 60 years of age, with œdema of the legs and feet, marked ascites, pale waxy complexion, and some dyspnœa. There was a mitral regurgitant murmur, hypertrophy of the heart, and constant palpitation. The retinæ of both eyes were strewn with hemorrhages, but there was very little exudation into the tissue of the retina. The urine contained albumen, but no casts.

Case fourth was a man, 23 years of age, and was an exceptional one, in that, though the retinal hemorrhages were very abundant, and the renal symptoms most marked, he had no cardiac lesion.

Case fifth was a man, 55 years of age, in whom the hemorrhages were confined to the right eye, though both retinæ were involved in the fatty degeneration. He had both valvular disease and hypertrophy of the heart. The urine contained albumen and casts.

Case sixth was a man, 43 years of age, with hemorrhage in both eyes, fatty degeneration of the retinæ, and hypertrophy of the heart, but no valvular lesion. He had uræmic convulsions, and his urine was loaded with albumen and casts.

Case seventh was a boy, aged 15 years, with fatty infiltration of the retina in each eye, but no hemorrhages. He had no heart disease, and no very pronounced signs of chronic renal disorder except frequent micturition, though there was a history of convulsions and his urine contained albumen.

Case eighth was a woman, 18 years of age, with very marked retinitis albuminurica in both eyes, but no hemorrhages. She had no cardiac disease, but a great deal of general anasarca. Urine albuminous.

Case ninth was also a woman, 19 years of age, with retinitis albuminurica in both eyes, though most developed in the right eye, but there were a large number of hemorrhages on and around the optic papilla. She had had acute articular rheumatism three years before, and had both valvular disease and hypertrophy of the heart. The urine contained neither albumen nor casts.

Case tenth was a man, 23 years of age, with retinitis albuminurica but no hemorrhages. There was no cardiac disease, but the liver was very much enlarged, and there was considerable abdominal dropsy. The urine contained albumen, but no casts.

Case eleventh was a woman, 35 years of age, with retinitis nephritica, and enormous hemorrhages in both retinæ. There was chronic valvular disease of the heart and some hypertrophy. The urine was albuminous, but contained no casts.

Case twelfth was also a woman, 47 years of age, with hemorrhages in each eye, punctate in character, and a general œdematous appearance of the retinæ. She had both hypertrophy and valvular disease of the heart. The urine contained albumen and casts.

Case thirteenth was a woman, 25 years of age, with typical retinitis albuminurica, but no hemorrhages, and this patient had no cardiac complication.

Case fourteenth was a woman, 50 years of age, with incipient cataract and posterior staphyloma in the left eye, and retinitis nephritica with many hemorrhages in the right eye. She had chronic valvular disease and hypertrophy of the heart.

Case fifteenth was a woman, 43 years of age, with both eyes affected by the peculiar exudation accompanying chronic Bright's disease, and numerous small hemorrhages in both eyes. Chronic valvular disease and very marked hypertrophy of the heart. Urine loaded with albumen and casts.

Case sixteenth was a woman, 20 years of age, who had for several months suffered from general anasarca and occasional convulsions, epileptiform in character. There was no history of rheumatism, and on examining her chest no cardiac disease was detected. Her urine was nearly half solid with albumen, and contained casts of all kinds. With the ophthalmoscope the retina of each eye was seen to be the seat of the peculiar changes accompanying Bright's disease, but there were no hemorrhages. This case I had an opportunity of observing from time to time for more than a year, and at no time was there any extravasation of blood seen.

Case seventeenth was a woman, 25 years of age, in whom the renal trouble was consequent upon a gravid uterus. It was her first pregnancy, and during the sixth month she had some swelling of the feet and ankles, and shortly afterwards a series of convulsions, which lasted till evening, when she aborted. Immediately after this her eyesight began to fail, and she complained of dyspnœa and palpitation. On examining her eyes, I saw a neuro-retinitis in both, with enormous exudation into the disk and

retina and upon the disk two considerable hemorrhages in the left eye, and a number of smaller ones in the right eye. An examination of the chest revealed hypertrophy and valvular disease of the heart. A few days later, an examination showed several fresh hemorrhages from the horizontal vessels in both eyes. This patient afterwards died from what was probably cerebral hemorrhage, as she was paralyzed on the left side and died comatose.

Case eighteenth was one of monocular retinitis albuminurica in a woman, 39 years of age. In the right eye there was a general haziness of the fundus, and the veins were engorged and tortuous. In the left eye, below and between the nerve and the macula, was a yellowish mass of exudation in the deeper layers of the retina, from which radiated streaks or lines of the same colour. Just above the main mass of exudation were several hemorrhagic spots of varying size, and one or two small, punctate extravasations upon the optic disk. This woman had both hypertrophy and valvular disease of the heart, and her urine contained both albumen and casts.

In going over these eighteen cases hastily, we see that in eleven cases of retinal hemorrhage there was valvular disease and hypertrophy of the heart. In one case of hemorrhage, there was hypertrophy of the heart, but no valvular disease. In five cases there were no hemorrhages in the retina, and no cardiac disease of any kind. And finally in only one case was there retinal hemorrhage without at the same time cardiac lesion. These results, though taken from a small number of cases, seem to bear out the opinion already expressed, that retinal hemorrhages rarely accompany retinitis albuminurica, unless the renal disease is complicated by disease of the heart.

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ART. IV.—*On Laparotomy, or Abdominal Section, as a Remedy for Intussusception; with Tables showing the Results of the Operation in cases of this Affection, and in those of other forms of Acute Obstruction of the Bowels.* By JOHN ASHHURST, Jr., M.D., Surgeon to the Episcopal Hospital, Surgeon to the Children's Hospital, etc.

IN my work on the *Principles and Practice of Surgery*, published in 1871, I expressed an unfavourable opinion of the operation of abdominal section in cases of intussusception or invagination of the bowels, though I added that I regarded it as a perfectly legitimate and proper procedure in cases of acute intestinal obstruction from other causes. The recent publication by Mr. Jonathan Hutchinson[1] of the history of a successful

[1] Med. Times and Gazette, Nov. 29, 1873, and Am. Journ. Med. Sci., January, 1874, p. 257.

operation of the kind in question, has led me to reconsider the subject, and to look more fully than I had previously done into its literature; and as a result of this further reflection and research, I feel bound to say that I can no longer consider the operation as never justifiable, though I still think that it can only be properly resorted to in very exceptional cases.

In the following pages I purpose to lay before the readers of this Journal some account of the cases in which the operation has been heretofore performed, and to endeavour to point out under what circumstances it may be resorted to with a reasonable prospect of benefiting the patient. It is at best a doubtful mode of treatment, and as such even the Celsian doctrine would not permit its adoption in any case not otherwise hopeless.

Laparotomy,[1] or abdominal section, is commonly said to have been first suggested as a remedy in cases of intussusception by Praxagoras, of Cos, one of the Asclepiadæ, who flourished about three and a half centuries before the Christian era. This statement is made on the authority of a passage in Cœlius Aurelianus[2] (for no writings of Praxagoras himself have come down to posterity), but Hévin,[3] who wrote against the operation in the last century,[4] declares that the passage has been misinterpreted,[5] and

[1] *Laparotomy;* from λαπάρα, the soft part of the body below the ribs, and τεμνω, I cut; the term *gastrotomy* is objectionable as being also applicable to the operation of opening the stomach. *Enterotomy* is an operation which aims exclusively at the formation of an artificial anus; it consists in making an incision, usually in the right iliac region, and opening the first portion of intestine which presents itself. *Colotomy* is an enterotomy practised upon the colon, and may be done either anteriorly or posteriorly. *Laparotomy* is distinctively an *exploratory operation*, and may or may not involve an incision into the bowel; when it does so, the term *laparo-enterotomy* is sometimes employed by systematic writers.

[2] Acut. Morborum, Lib. iii., cap. xvii. (Amst. 1722, p. 244).

[3] Mém. de l'Acad. de Chirurgie (Paris, 1819), t. iv. p. 264.

[4] According to Ducros (*Archives Gén. de Médicine*, Aout, 1838, p. 461), Hévin in a posthumous memoir, published in 1836, took a diametrically opposite view of this question, and strongly advocated the operation in certain cases.

[5] The passage is no doubt an obscure one, but M. Hévin seems to me to have still further darkened counsel by his interpretation of it. Praxagoras, Aurelianus has been saying, employed emetics until he caused the vomiting of feces; some, after vomiting, he bled, and filled with wind through the anus, as advised by Hippocrates, and again, following Hippocrates, ordered the giving of sweet wine, etc. He then adds: "Some, in whom the intestine which the Greeks call the *blind gut* had, being filled with much fecal matter, slipped into the scrotum, he, pressing the bowels with his hands, vexed with great shaking. In some again, the above-named remedies having been exhausted, he advised that the belly should be divided even to the pubes (*dividendum ventrem* probat pubetenus); he said also, coming to impudent (protervam) surgery, that the rectum should be divided, and sewed up again when the feces had been withdrawn." The first paragraph which I have quoted no doubt indicates a rough kind of taxis in cases of scrotal hernia, but the second seems to me, by every fair interpretation of the text, to refer not merely to cases of hernia but to cases of the "iliac passion"

that Praxagoras merely taught the proper use of the knife in cases of strangulated hernia. Be this as it may, there is no evidence that the Greek Surgeon ever himself performed the operation, and the next reference to it appears to date back no further than the latter part of the seventeenth century, when Paul Barbette,[1] a surgeon of Amsterdam, after describing the symptoms and pointing out the often hopeless character of intussusception, asks "whether it would not be better, having made a dissection of the muscles and peritoneum, to take the intestine with the fingers and draw it out, than to abandon the patient to certain death?" Commenting upon this passage, Bonetus gives the details of what I think must be considered as the first recorded case of laparotomy for intussusception.[2] Hévin, indeed, rejects this case because it was communicated to Bonetus by a non-professional person (a clergyman of Geneva, who had long been intimate with the patient), and therefore was no doubt, he says, a simple herniotomy; but surely Bonetus was anatomist enough to know the difference between the two operations, and would not have adduced a case of the one as an example of the other. If we accept the case as genuine at all, we must, to be consistent, likewise accept Bonetus's interpretation of it.

CASE I.[3]—Baroness L—, suffering from ileus, was looked upon as being beyond remedy; there presented himself a young surgeon, who had long followed the camps, who promised certain safety if only the noble patient would submit to the making of an incision in her abdomen. She having consented, the surgeon went to work, and having drawn out and unrolled many intestines before the twisting and doubling up (convolutio et contortuplicatio) appeared; having by chance found this, he unfolded it, and loosed the knots, and afterwards restored it to its position. From this time, having sewed up the belly, he consolidated the wound with the happiest success, and restored the noble lady to entire health.

It is satisfactory to know that the grateful patient rewarded the skilful operator by conferring upon him an annuity, which, unhappily, he only lived to enjoy for three years.

The second recorded case, which also terminated successfully, is known as Nuck's, but it does not appear that this distinguished anatomist him-

generally. Certainly the ordinary operation for scrotal hernia does not consist in dividing the belly even to the pubes. M. Hévin's suggestion that perhaps the expression *rectum intestinum*, in this passage, does not mean the rectum, seems hardly worthy of contradiction.

[1] Anatom. Pract. Lib. iv., cap. i.—I have not been able to refer to Barbette's work, but the passage is quoted by both Bonetus and Hévin.

[2] Dr. Samuel Whitall, of New York, in an interesting memoir on the operative treatment of intestinal occlusion in general (*N. Y. Med. Journal*, August, 1873), quotes this case, from a recent thesis by Delaporte, of Paris, as one of *volvulus* or twisting of the bowel; Bonetus himself however gives it as an example of *intussusception*, and it is so cited by Velse, in connection with Nuck's case to be presently referred to.

[3] Bonetus, Sepulchretum, t. ii. p. 228 (Genevæ, 1700).

self performed the operation, though it was done at his instance, and under his direction. An account of this case, the authenticity of which seems never to have been doubted until within the last fifty years, is given in the seventh volume of Haller's Anatomical Disputations, in the Inaugural Thesis of a certain Dr. Cornelius Henry Velse, on the authority of a pupil of Nuck, "a most truthful man and worthy of all confidence, H. Oosterdyke Schacht." In commenting upon the case recorded by Fuchsius, which will be considered hereafter, Dr. James Johnson, or one of his collaborators, says: "Our author informs us that Nuck performed a similar operation, as recorded in Haller's disputations. We have searched for the case, but could not find it;"[1] and Dr. Stephen Rogers, of New York (who by a curious coincidence misspells Fuchsius's name in the same way as his English predecessor), adds: "I have also searched for it with no better success. I therefore regard it as doubtful."[2] A community of ill luck in research which can only be accounted for by supposing that both investigators looked in the wrong work—perhaps in the seventh volume of Haller's collection of *Medical* disputations, instead of in the corresponding part of his *Anatomical* series. Nuck's case is as follows:—

CASE II.[3]—When, indeed, a woman fifty years old, worn out with the symptoms of this most cruel disease [intussusception], obtained relief by no remedies, whether enemata, fomentations, poultices, or the application of huge cups to the abdomen, which were successively employed by the celebrated Nuck; he, most happy in practice, suspecting the existence of invagination, caused a most skilful surgeon to make an opening in the abdomen four fingers' breadth from the umbilicus and in an oblique direction backwards and downwards, to draw out the intestines (which were without delay warmed with tepid milk), to search for the seat of intussusception, to disentangle this slowly, presently to replace all the intestines, and at length to sew up the abdominal wound.

By this bold operation, and Nuck's judicious after-treatment, the patient, we are told, "was, as it were, snatched from the throat of death," and survived twenty years. It is particularly mentioned (and this is a point of some importance) that at the operation the bowels were found "not yet inflamed, nor adherent (inflammata necdum, nec coalita)."

The third case, in chronological order, is reported with full details by Dr. F. A. Fiedler, as having occurred in the practice of General-Staff-Surgeon Professor Ohle, of Dresden. The patient died from exhaustion and peritonitis a few hours after the operation.

CASE III.[4]—The patient was a man fifty years old, who, though of a strong constitution, was very irritable, and had suffered periodically, since March, 1810, from hemorrhoidal colic, with blind, and sometimes bleeding, piles. A year before he had had a severe nervous fever, accompanied with obstinate constipation, and had since often complained of difficult defecation, which was

[1] Medico-Chirurgical Review, N. S., vol. iii. (London, 1825), p. 539.

[2] Trans. N. Y. State Medical Society for 1872, p. 323.

[3] Haller, Disputat. Anatom. Select., vol. vii. (Gottingæ, 1751), p. 126.

[4] Magazin für die gesammte Heilkunde, herausg. v. J. N. Rust; Bd. ii. s. 253 (Berlin, 1817).

always attended with a feeling of fulness and straining in the left side of the abdomen. This colicky condition with constipation and difficult micturition continued more or less until July (being, however, usually relieved every three or four days by mild laxatives, or by antispasmodics and anodynes, with oily inunctions, fomentations, and enemata), but from that time until September was entirely absent. The patient was, by his occupation, unfortunately, constantly exposed to the risk of catching cold, and after long exposure his disease returned with abundant bloody stools. After being again chilled about the 6th of October, fever set in, with shivering, tenesmus, constipation, and dysuria, which could be relieved neither by the remedies which had previously been employed, nor by the application of leeches to the fundament. Although there had been no passage for four days, the belly was swollen only in the right hypochondriac and iliac regions, while there was pain on slight pressure especially in the undistended portions. The pulse was almost, if not quite, normal. All medicines were vomited, but not drink. The patient complained of a tumour which completely filled the cavity of his rectum, and by the constant and violent straining was forced down to the anus. Here lay the lower end of an everywhere unattached tumour, which descended by the left side of the promontory of the sacrum, and by efforts at urination and defecation was readily protruded to the extent of about half an inch; its body, on the side of the bladder, felt smooth, but behind, in the hollow of the sacrum, rough and uneven, and its base, which could hardly be reached by the finger, seemed indented and as if covered with a membrane. In spite of the persistent use of emollient poultices, with anointing of the belly, the injection of demulcent decoctions into the rectum, and the inward administration of an oily emulsion with laudanum, the tumour remained without change. All the symptoms became aggravated, especially the colicky pain, which was accompanied with troublesome straining, and which, always beginning in the left flank and spreading over the whole abdomen, was only mitigated by vomiting. The patient now took calomel and opium, and in the intervals lenitive electuary, with enemata; the belly was alternately rubbed with camphorated ointment of marshmallow and soap liniment. A bougie was introduced into the rectum so as, if possible, to push up the tumour, but all these experiments proved fruitless, as did the employment of a bath with inunctions on the 12th of October, and injections of decoction of hyoscyamus with laudanum, and clysters of decoction of tobacco and tobacco smoke. An attempt was also made to draw out the tumour with forceps wrapped with sticking-plaster, on the 14th of October, but as fruitlessly as the pushing back of the same into the rectum, whereby it seemed as if the finger, squeezed into the inch-wide cavity of the tumour, was grasped by this, and surrounded by a cool stream of air.

At last, on the 15th of October, Dr. Ohle was called in consultation, and immediately made a close examination of the rectal tumour. This had the smoothness of bowel, was indented on its posterior surface, measured about three inches transversely, and on its anterior surface, sweeping towards the anus, had the form of the segment of a ball. In its middle was a blind sinus into which the point of the forefinger entered. The left side of the belly was flattened, but all the rest swollen. The vomiting after taking medicine or drinking, as well as after each paroxysm of pain, gave the patient great relief. The pulse was nearly normal, the respiration free, and the skin everywhere of a proper temperature. At each periodic return of the straining, the tumour was violently forced downwards. The urine was of a brownish-red colour, and deposited a red sediment. All these signs, taken in connection with the history of the case, indicated an intussusception of the colon, wherefore Dr. Ohle tried first the taxis, but without any result.

On the 17th of October the tumour was, upon the repeated entreaties of the patient, who looked upon it as a great mass of hemorrhoids, cautiously opened with a knife by a certain surgeon without the cognizance of the other medical attendants; only a little hemorrhage followed, and soon stopped of itself. Shortly after, the physicians found not only the tumour driven out by straining, with its rough covering of mucous membrane, but they saw also five dark-red epiploic appendages protruded from the yet recent wound, and felt among them

a portion of small intestine—Ohle thought of the jejunum—whereby the existence of a true intussusception of the colon was plainly enough revealed.

As all the remedies hitherto employed had proved unavailing, Ohle, with the consent of the patient and of the other physicians, undertook laparotomy the same afternoon.

After the bladder had been emptied by means of a catheter, and the patient placed almost on his right side, the line of incision was marked with India ink, out of the course of Poupart's ligament and of the left femoral and epigastric arteries, extending from the junction of the cartilages of the second and third false ribs to a point one inch above the anterior superior spinous process of the ilium, 5½ inches long, and parallel to but 3¼ inches[1] from the linea alba. The skin and external oblique muscle having been divided, and a small artery tied in the upper angle of the wound, an opening was made through the remaining muscles and the peritoneum, and enlarged upwards and downwards with scissors and a probe-pointed hernia-knife.

As the edges of the wound were somewhat drawn apart by an assistant, the transverse colon, distended with gas, deeply congested, and a little displaced to the left, appeared at the upper part of the incision, together with the gastro-colic omentum. While Ohle, with his oiled left hand in the abdominal cavity, traced up the transverse colon from its projecting part to the seat of intussusception, the greater part of the colon, with the small intestines, protruded from the left side of the wound, but were gently held back by an assistant with linen soaked in warm water. Meanwhile, since, on account of the tightness of the invagination, disentanglement could not be effected without force, another surgeon pushed the tumour up from below through the rectum, while Ohle himself, after cautiously separating the adhesions in the whole periphery of the intussusception, and joining his fingers on both sides, with his right hand gently withdrew the invaginated colon, and gradually unfolded it. The length of the adherent colon was almost twelve inches. In the blind end of the cæcum lay a portion of displaced jejunum, which, like the descending colon, was much inflamed and abnormally thickened. The inch-long transverse wound which before the laparotomy had been made in the flexure of the colon, was now closed by a bowel suture and held by an assistant with a waxed thread passed through the left mesocolon, in order that the protruded portion should be replaced and the edges of the wound reunited with a knotted abdominal suture. The ligature and suture threads were, as well as the abdominal dressings, fastened with sticking-plaster, Ohle's uniting bandage being then applied, and the whole covered with a fourfold compress steeped in warm oxycrat (vinegar and water) The patient was placed almost on his right side, given ten drops of Sydenham's laudanum, and allowed an occasional drink of almond emulsion. Two hours afterwards he complained of a fixed pain at the lower part of the wound; his pulse became small and quick; he suffered great thirst; but his temperature was not abnormal. In six hours he had a soft, and very offensive stool, and at night was hot, restless, and delirious. His pulse failed rapidly, his breathing became difficult, but his pain was relieved. Involuntary evacuations followed, and the patient died towards morning with a gradual aggravation of all his symptoms. A *post-mortem* examination made thirty hours after death revealed general peritonitis, with an inflamed and gangrenous condition of the part of the bowel which had been implicated in the invagination.

The above case I have given at some length, as it appears never to have been published either in England or in this country. A fourth, and the third recorded *successful* instance of laparotomy for intussusception, was communicated by the operator, Dr. Fuchsius, to Hufeland's Journal for February, 1825. An extract of this case appeared in Johnson's *Medico-Chirurgical Review* for the same year, and its chief features have also

[1] Erroneously stated in the text as ¾ inch, but correctly given in the account of the autopsy.

been reproduced by Dr. Stephen Rogers, in his paper read before the New York State Medical Society, and already referred to.

CASE IV.[1]—The patient was a strong and healthy man, 28 years old, who, while at work, was suddenly seized with violent pain in the region of the umbilicus. With great difficulty he succeeded in reaching his home, where he lay down in the open-air and went to sleep; on awaking, he vomited some mucus, and felt relieved; in the evening his bowels were moved, but not freely. During the night the pain was bearable, but returned periodically. The next day the symptoms were aggravated, paroxysms occurring every twenty or thirty minutes, and lasting five minutes at a time. The corporation-doctor who was called in now prescribed cathartics and enemata, and bled the patient from the arm; temporary relief was obtained, but in the evening the pains recurred with increased frequency. No passage was obtained from the bowels, but large quantities of wind were brought up by eructation after every paroxysm. Anodynes were now administered, and camphorated ammonia liniment was applied to the abdomen, while frequent lukewarm baths were also employed, and the enemata continued. Fuchsius was called in consultation on the fifth day, and on the seventh, finding that no improvement had followed the various remedies employed, suggested an operation; this, however, was not permitted by the patient until the tenth day, when, in addition to the previously mentioned treatment, six ounce doses of metallic mercury had been fruitlessly tried. The operation consisted in making a small opening about two inches above the position of the umbilicus and in the line of the outer border of the right rectus abdominis muscle, the wound being subsequently enlarged with a probe-pointed bistoury to the extent of seven or eight inches. Introducing his oiled hand into the cavity of the abdomen, Fuchsius discovered an intussusception, but found that he could not reach the point at which it began without making a transverse incision from the right to the left of the belly; rather than do this, he determined to open the bowel itself at the lower end of the intussusception, and by introducing his finger into the gut to effect reduction by gradually pushing the invaginated portion from below upwards. In this manner he succeeded in relieving the intussusception which involved a portion of intestine over two feet in length. A large round worm was found in the opened bowel, but there was no trace of inflammation nor any abnormal condition. The intestinal wound was closed with a continued suture of silk, the ends being brought through the external wound, which was itself closed with the ordinary interrupted suture. Convalescence was satisfactory, the bowels being spontaneously moved on the night of the second day, and the patient having entirely recovered by the fourteenth day after the operation.

The next case appears to have been the first in which laparotomy was practised for intussusception in a child. The operator was Gerson, and the case was communicated by him to Dr. Hachmann, of Hamburg, by whom it is reported.

CASE V.[2]—The patient was a male infant, twelve weeks of age, and was seen by Dr. Gerson on Sept. 18, 1828. In addition to symptoms of obstruction there was hemorrhage from the bowels, and a tumour was recognized in the inguinal region as well as by digital exploration of the rectum. An oblique incision was made in the direction of Poupart's ligament, beginning about two fingers' breadth from the anterior spine of the ilium and passing inwards. As soon as the abdominal cavity was opened, a bunch of invaginated intestines was found in the left inguinal region; the adhesions were very firm, yet it was possible to draw out about an inch of the invaginated portion in a tolerable condition,

[1] Journal der Practischen Heilkunde, herausg. v. Hufeland und Osann, lx. Band, ii. Stück, s. 42.

[2] Zeitschrift für die gesammte Medicin, herausg. v. Fricke u. Oppenheim, Bd. xiv. (1840), s. 303.

that which followed being of very thin calibre, about the thickness of an adult processus vermiformis; after about a foot's length had been thus disengaged, without materially diminishing the thickness of the mass, the bowel gave way under traction, at a gangrenous part. The operation was under these circumstances abandoned; the little patient remained lively for a while, but died about six o'clock in the afternoon.

The only case, so far as I know, in which laparotomy for intussusception has been resorted to in this country, occurred in the practice of Dr. John R. Wilson, of Tennessee, afterwards of Mississippi, and was communicated by his pupil, Mr. W. W. Thompson, to the *Transylvania Journal of Medicine and the Associated Sciences* for 1835.

CASE VI.[1]—The patient was a negro, 20 years of age, who for seventeen days had suffered from symptoms of intestinal obstruction. There was stercoraceous vomiting, but no mention is made of intestinal hemorrhage. The treatment had consisted in the administration of active purgatives and metallic mercury. The operation consisted in making an incision five inches in length in the linea alba, the umbilicus being about the middle of the wound. The bowels protruded, and the seat of obstruction was found in the ileum. Disinvagination was effected by grasping the intestine above and below, and forcibly rupturing the adhesions, which were quite firm. The bowel and omentum were deeply congested, and "seemed to be on the verge of mortification." The wound was closed with sutures and adhesive strips, and the patient placed in bed. "His recovery was rapid and entire."

The next case in chronological order is that of Hauf or Hauff, which was published in the *Heidelberg Medical Annals* for 1842. I have not been able to refer to the original report, and therefore give the operator's name on the authority of Adelmann[2] and Leichtenstern,[3] both of whom include the case in their tables. Dr. Whitall erroneously cites the case as Krug's, the fact being that Krug was merely the compiler who furnished an account of the case to *Schmidt's Jahrbücher* for 1843.

CASE VII.[4]—The patient was a man, 36 years of age, not large, but strongly built, of an atrabilious constitution, "a good worker, but a still better eater and drinker." In the month of May, while overheated, he drank cold, sour, unfermented wine, and was immediately seized with violent colic, which forced him to roll on the ground and cry aloud. This lasted with little interruption for more than a month, until in July the patient finally allowed himself to be taken to the hospital. At this time he was jaundiced and somewhat emaciated, and at varying intervals suffered from violent colicky pains of greater or less duration; he had from two to eight stools daily, passing coagulated blood, pus, and mucus, mixed with fecal matter, but the latter only in small particles. The belly was not distended, but sometimes in one place, sometimes in another, though particularly in the left hypogastric region, were felt isolated sausage-shaped swellings two to four inches long, one such almost constantly corresponding in position with the sigmoid flexure. These gave a clear tympanitic sound on percussion. The belly generally felt tight, and was sensitive, partic-

[1] Transylvania Journal of Medicine, vol. viii. p. 486, and Am. Journ. of the Med. Sciences, vol. xviii. (O. S.) p. 262.

[2] Vierteljahrschrift für die praktische Heilkunde (Prag.), Bd. lxxviii. (1863), s. 42.

[3] Ibid., Bd. cxxi. (1874), s. 45.

[4] Heidelb. Med. Annal., Bd. viii., s. 428, and Schmidt's Jahrbücher, Bd. xl. (1843), s. 214.

ularly at the localities of the above-mentioned swellings. There was no fever, urination was regular, and the appetite was good, though taking food sometimes caused pain in the abdomen; nothing abnormal was discovered by careful exploration per anum. The disease was, therefore, regarded as chronic enteritis with ulceration of the mucous lining of the bowel, and leeches were applied to the belly, oily emulsions given, and enemata of cold flaxseed mucilage. Some relief was obtained by these measures, but the condition of the abdomen and the stools remained the same. For the intestinal swellings, which under the finger could be felt to vary in size with the peristaltic motions, assafœtida emulsions were given, cold fomentations applied to the belly, and enemata of cold water administered. Rectal exploration still gave a negative result. The condition of the patient now yet further improving, he left the hospital, and was not again heard from until October, having in the interval felt tolerably well, though his pains occasionally returned, and though he frequently had a sensation of some obstruction in the rectum; digital exploration now revealing the presence of a round soft body the size of a walnut. One night, after the patient had plentifully indulged in new wine, and had subsequently become chilled, the pains and straining recurred, and this rectal body sank lower, and more than once, under violent straining, protruded as a dark-red tumour the size of an apple. The belly was now distended and tympanitic, but not very tender, and the tumour in the left hypogastric region was again conspicuous. Two and a half inches within the rectum was found a rosette-like soft tumour, the size of an apple, nearly filling the pelvis. The finger passed all around it, and at its middle was an opening, which was formed by a hard stricture feeling like a hard lip of the os uteri. The rectum itself was normal, and the tumour not painful, but there was a discharge of bloody mucus from the anus. The tumour, recognized as an invaginated portion of bowel, was readily replaced through the stricture, with relief to the patient. On the next morning, however, the protrusion recurred, with tenesmus and discharge of bloody mucus, and the tumour, now harder, more tense, and closely embraced by the stricture, could not be replaced. Incessant vomiting followed, with hiccough, great meteorism, a small, quick pulse, Hippocratic countenance, and most violent pain in the enlarging tumour, which in size and hardness resembled that produced by a child's head entering the pelvis. Three days later a completely gangrenous portion of empty large intestine protruded from the rectum, from which flowed an offensive liquid. Reposition was now easy; no hard tumour could be felt, and no stricture, but only a kind of pouch, which came down again as often as it was pushed up; vomiting had ceased, but there was no action from the bowels; the belly was distended, and the tumour of the left side felt like a degenerated ovary. By the wish of the patient laparotomy was now undertaken, not with a hope of relieving the invagination, for the bowel must long since have become gangrenous, but that the patient might perchance be saved by the formation of an artificial anus. An incision three inches long was made from below upwards and outwards, two inches above Poupart's ligament and four inches to the left of the linea alba. As soon as the peritoneum was cautiously opened, a pint of clear, yellow, inodorous fluid instantly spirted out in a stream; the peritoneum was bluish, and one inch thick. The wound having been enlarged, the finger immediately came upon a stony-hard, sausage-shaped tumour, and at all accessible points were hard knotted rolls the thickness of the finger. The surface towards the operator was of a dusky bluish-red colour, and manifestly consisted of intestine with greatly thickened walls. No cavity was reached by a deeper incision, and by a still deeper wound it appeared that only a thickened intestinal wall, closely compressed by another portion of bowel lying posteriorly, was cut through, behind which the latter was plainly revealed just as the former had been by the first incision. The finger felt on all sides the already-described knots, and innumerable adhesions; in separating these the contents of the bowel escaped from the wound, but the point of rupture was in vain sought for. The operator now wished to divide the tumour transversely, but after he had cut into it to the depth of an inch without finding the cavity of the bowel, he abandoned all further search, arrested the hemorrhage, and placed the ligatures with a tent in the lower angle of the wound. The

operation occupied half an hour. The following night was tolerably peaceful; there was no vomiting, but severe pain. The next morning a large quantity of fecal matter and intestinal mucus appeared at the wound, and the finger found the tumour as on the day before; the belly was distended and tympanitic; and the gangrenous intestine protruded about six inches beyond the anus. This [gangrenous mass] was cut out from the rectum at as high a point as could be reached with scissors. These symptoms continued without much change, fecal matter passing from the wound and a little from the anus, and the patient complaining less of pain than of unquenchable thirst, and retaining perfect consciousness until his death on the ninth day after the operation. A *post-mortem* examination showed the bowels and omentum matted together in the hypogastric region; the whole intestinal canal, and especially the stomach, distended with air and of a bluish-red colour; the tumour behind the abdominal wound dusky bluish-red, very hard, six inches long and two or three thick, and the three incisions which were made at the time of the operation gaping, without any attempt at repair, and with feces at their deepest parts. The whole mass consisted evidently of three portions of bowel invaginated together, the beginning of the intussusception being in the ileo-colic region. The lower third of the ileum formed the beginning of the invaginated portion, and a part of the cæcum with the appendix vermiformis, contracted, dark-red, and adherent on all sides, formed the innermost part of the tumour. The invaginated ileum, on the other hand, was but little reddened, and not much altered. The next part involved in the invagination was the descending colon, which was drawn over to the right, and passed immediately into the sloughing, dark crimson, ulcerated rectum. The walls of all the above-named portions of intestine were much hypertrophied. In the cavity of the pelvis all was adherent and bluish-red in colour, and it could not be ascertained to which portion of the large intestine the part removed by sloughing had belonged, nor in what manner fecal matter could have reached the anus, since nowhere was any channel to be found which was sufficient for the purpose. The rest of the bowels were pushed out of place, the omentum and mesentery thickened in parts, the liver and gall-bladder very large but healthy.

All the cases hitherto considered, with the exception of Gerson's, occurred in adults; the next occurred in an infant, and is reported by the operator, Mr. Spencer Wells.

CASE VIII.[1]—The patient was a child four months old, and symptoms of intussusception had lasted more than four days when the operation was resorted to, injections, insufflation of air, and the use of a sponge-probang having previously failed to relieve the invagination which could readily be felt by introducing the finger into the rectum. An incision two inches long was made in the median line, just below the umbilicus, and disinvagination was effected with some difficulty. Acupuncturation of the intestine was also practised to relieve its distension. The child was almost moribund when the operation was begun, and actually died five hours after its termination.

Of the three next cases I am able to give but few details; one of them has, I believe, never been published, and the other two I know only from the tables of Adelmann and Leichtenstern.

CASE IX.[2]—The operator in this case was Pirogoff. The patient was a lad, sixteen years of age, and the symptoms of obstruction were of considerable duration. The invaginated portion of bowel was found in a gangrenous condition; the gut was opened, and its edges attached to those of the external wound. Death occurred shortly after the operation.

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[1] Trans. Path. Society of London, vol. xiv. (1863), p. 170.

[2] Vermischte Abhandlungen aus dem Gebiete der Heilkunde, St. Petersburg, 1852, s. 150; quoted by Adelmann (*loc. cit.*, p. 44), and by Leichtenstern (*loc. cit.* p. 45).

CASE X.[1]—The operator was M. Laroyenne, of Lyons. The age of the patient is not mentioned. Disinvagination was impossible on account of the existence of adhesions. The case terminated fatally.

CASE XI.[2]—This case, which occurred in the practice of Mr. Athol Johnstone, appears never to have been published; it was referred to by Mr. Holmes in the discussion which followed the reading of Mr. Hutchinson's case before the Royal Medical and Chirurgical Society of London. The patient was a child, and the case terminated fatally.

In the next case the operator was Prof. Weinlechner, of Vienna; I have not been able to refer to the original report by Dr. Maximilian Herz, and have, therefore, taken the facts of the case from the abstracts in Schmidt's *Jahrbücher* and in Hayem's *Revue des Sciences Médicales.*

CASE XII.[3]—The patient, a female infant of six months, was suddenly attacked in the night with violent colicky pains, followed by a slightly bloody stool. There was another paroxysm the next morning, and from this time the discharges consisted almost exclusively of bloody mucus, while food was vomited as soon as it was taken. On the following day a tumour was felt in the left hypogastric region, and was recognized as an intussusception of the descending colon. No information was gained by a digital exploration of the rectum. Prof. Weinlechner operated on the morning of the fourth day without the aid of chloroform; an incision three inches long was made over the tumour, and the peritoneum cautiously opened upon a grooved director. The invaginated portion was found to consist of the extremity of the ileum, the cæcum, and processus vermiformis, and the ascending and transverse colon; the tumour measured three inches in length, and about two fingers' breadth in its other dimensions. The parts were very much congested, and disinvagination and reposition were effected with great difficulty. The wound was closed with twelve sutures, and cold compresses applied; but the child died six hours afterwards in convulsions, a post-mortem examination revealing the existence of acute peritonitis.

The last case to be considered is that reported by Mr. Hutchinson; it has been so recently published in this Journal, that a very brief reference to it will be sufficient.

CASE XIII.[4]—The patient was two years old, and the intussusception had been a month in forming. Its extremity, presenting the inverted ileo-cæcal valve, protruded several inches beyond the rectum. The abdomen was opened in the middle line below the umbilicus, and disinvagination was effected without difficulty. Recovery was rapid. This case is quoted by Leichtenstern from the Transactions of the first Congress of the German Surgical Association, held at Berlin in 1872; but the age of the patient is incorrectly given as four years, and the operation is said to have been performed on the tenth day. This case is also referred to by Mr. Waren Tay, in the Biennial Retrospect of the New Sydenham Society for 1869–70 (p. 295).

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[1] Servier, De l'occlusion intestinale, 1870; Leichtenstern, *loc. cit.*).

[2] Holmes, in British Medical Journal, Dec. 6, 1873, p. 661.

[3] Oesterr. Jahrbuch für Pädiatrik, Bd. i. (1872); Schmidt's Jahrbücher, Bd. clvi., s. 119; and Revue des Sciences Médicales, t. i., p. 218 (Paris, 1873).

[4] Med. Times and Gazette, Nov. 29, 1873; Brit. Med. Journal, Dec. 6, 1873, and Am. Journ. of the Med. Sciences, Jan. 1874, p. 257.

Tabular view of Thirteen Cases of Laparotomy for Invaginated Bowel.

No.	Sex and age of patient.	Operator.	Symptoms before the operation.	Duration of disease.	Result.	Duration of life after operation.	Remarks.
1	Female, adult	Military surgeon referred to by Bonetus	Symptoms of "Ileus"	Not mention'd	Recovered	....	Case rejected by Hévin, but accepted by Velse.
2	Female, aged 50 years	Surgeon employed by Nuck	Not specified	Not mention'd	Recovered	....	Patient was "worn out" by her sufferings; enemata, etc., failed to give relief; bowels not inflamed nor adherent.
3	Male, aged 50 years	Ohle	Symptoms of obstruction, with vomiting, great pain, and hemorrhage from the bowels	11 days	Died	About 12 hours	The intussusception, which protruded from the rectum, had been previously cut into. Autopsy showed peritonitis and gangrene of bowels.
4	Male, aged 28 years	Fuchsius	Symptoms of obstruction merely	10 days	Recovered	....	In order to effect disinvagination, it was found necessary to open the bowel.
5	Male, aged 12 w'ks	Gerson	Symptoms of obstruction with hemorrhage from the bowels	Not mention'd	Died	A few hours	Bowel ruptured, and operation abandoned.
6	Male, aged 20 years	Wilson	Symptoms of obstruction merely	17 days	Recovered	....	Firm adhesions; parts much congested.
7	Male, aged 36 years	Hauff	Symptoms of obstruction, followed by peritonitis, with hemorrhage from bowels, and gangrene of mass which protruded from rectum	Several days	Died	9 days	Bowel ruptured and operation abandoned.
8	Child aged 4 mos.	Spencer Wells	Not specified	4 days	Died	5 hours	Child almost moribund at time of operation.
9	Male, aged 16 years	Pirogoff	Not specified	Sympt'ms of considerable duration	Died	Died shortly after operat'n	Gangrene of bowel; an artificial anus was made.
10	....	Laroyenne	Not specified	.....	Died	....	Adhesions prevented disinvagination.
11	Child	Athol Johnstone	Not specified	.....	Died	....	
12	Female, aged 6 mos.	Weinlechner	Symptoms of obstruction, with great pain, vomiting, and hemorrhage from the bowels	3 days	Died	6 hours	Died in convulsions; peritonitis found at autopsy.
13	Female, aged 2 years	Hutchinson	Symptoms of obstruction merely. Intussusception protruded from anus	1 month	Recovered	....	Disinvagination effected without difficulty.

I have in the preceding pages brought together, with more or less detail, the histories of thirteen cases in which laparotomy, or abdominal section, has been undertaken for the relief of intussusception. This number is I believe larger than that collected by any previous writer, and, though too small to be of much value for statistical purposes, is sufficient to enable us to draw some conclusions of value as to what cases may hereafter be submitted to this mode of treatment with a reasonable hope of benefiting the patient.

An inspection of the table shows, in the first place, that no encourage-

ment is afforded to repeat the operation in very young infants. The only cases in which it has been resorted to during the first year of life, have all terminated fatally (Gerson, Wells, Weinlechner). But when it is remembered that of Pilz's[1] 162 cases (all occurring in children), no less than 91 were in infants less than a year old, it will be seen how large a proportion of cases must at once be put aside as unfitted for operative treatment. It is very true that the fatality of intussusception at this early age is enormous, the mortality being according to Leichtenstern's[2] elaborate statistics no less than 86 per cent. But the case is very different from that, for instance, of an operation for imperforate rectum; for in this condition there is necessarily no hope but in an operation, whereas in the case of intussusception experience shows on the one hand that, even at this age, a certain number do recover without operation, and on the other hand that, as might indeed be expected, operative treatment is in such cases of no avail.

In the second place, the table shows that in what may be called *acute* cases, those, namely, in which in addition to symptoms of obstruction there are evidences of strangulation, such as peritonitis and intestinal hemorrhage, a resort to operative interference will be productive of no benefit. These cases are, on the other hand, as justly remarked by Mr. Hutchinson, precisely those in which there is most hope of recovery by sloughing of the invaginated portion. This point is well illustrated by Leichtenstern, who finds that of 557 cases of which the termination is known, sloughing occurred in 149, of which 88 ended in recovery and 61 (41 per cent.) in death, while of the 408 in which sloughing did not occur, only 63 terminated favourably and 345 (85 per cent.) in death.

There remains then a limited number of cases, in adults or at least not in very young infants, in which the symptoms are those of obstruction merely, without intestinal hemorrhage or peritonitis, and in which, when other measures fail, the question of operation may properly be considered. And here it may be said that if any operation at all is to be performed, *abdominal section* should be chosen rather than either *enterotomy* or *colotomy:* these could at best give but temporary relief, and have, I believe, never proved of permanent value in any case of intussusception; whereas *laparotomy*, as seen by the table, has already proved successful in five instances. At what period the use of enemata and other bloodless remedies should be abandoned, and operative measures instituted, must, in the absence of further experience on this point, be left to the judgment of the surgeon in each particular case.

If the cases which I have tabulated are to be used for purposes of statistical comparison, the first two (Bonetus's and Nuck's) should, I

[1] Schmidt's Jahrbücher, Bd. cxlvi., s. 178.

[2] Loc. cit., p. 17.

think, be left out of consideration: these were single successful cases, each occurring in a separate century, and (were all the facts known) could no doubt be over-matched by unsuccessful cases which have never been recorded. Of the eleven cases which have occurred during the present century, three terminated in recovery, and eight in death—a proportion which corresponds almost exactly with that which, as shown by Leichtenstern, obtains for all cases of intussusception taken together, for of 557 terminated cases collected by this writer, 151 (27 per cent.) ended favourably, and 406 (73 per cent.) proved fatal.

Before terminating this paper I must refer briefly to the results of laparotomy in the treatment of intestinal obstruction from other causes than intussusception. This subject has been studied statistically by several authors, among whom may be particularly mentioned, Phillips,[1] Delaporte,[2] Whitall,[3] of New York, and Adelmann.[4] The last named writer has tabulated 33 cases, of which, however, five are examples of intussusception. In the annexed table I have brought together 57 cases, which, with the 13 of invaginated bowel already considered, make a total of 70 cases of laparotomy for intestinal obstruction, the largest number, I believe, which has as yet been collected.

Tabular view of Fifty-seven Cases of Laparotomy for Acute Intestinal Obstruction from other causes than Intussusception.

No.	Operator.	Nature of lesion.	Result.	Reference.
1	Adelmann	Protrusion of intestine through slit in rectum	Died	Prag. Vierteljahrschrift, Bd. lxxviii. s. 42, Nro. 13.
2	"	Strangulation persisted after reduction of hernia	"	Ibid., s. 55.
3	Andersen	Strangulation by a band	"	Med. Times and Gazette, 1858, vol. ii. p. 45.
4	Annandale	" " "	"	Edinburgh Med. Journal, vol. xvi. (1871) p. 700.
5	Avery	Stricture of colon	"	Trans. Path. Society, London, vol. ii. p. 62.
6	Berndt	Volvulus	Recovered	Adelmann, Prag. Vierteljahrschrift, Bd., lxxviii., s. 42, Nro. 10.
7	Billroth	Strangulation persisted after herniotomy	Died	Archiv für klinische Chirurgie (Langenbeck), Bd. i., s. 485.
8	Borelli	Strangulation by a band	Recovered	Whitall, in N. Y. Medical Journal, August, 1873, No. 20.
9	Brodie	Protrusion of intestine through slit in rectum	Died	Lancet, vol. xii. (1827) p. 502.
10	Bryant	Strangulation by a band	Recovered	Med.-Chir. Transact'ns, vol. l. (1867) p. 65.
11	Buchanan	Volvulus	"	Lancet, 1871, vol. i. p. 776.
12	Canton	Internal strangulation	Died	London Medical Gazette, vol. xii. (N. S.) p. 78
13	Coulson	Obturator hernia	"	Lancet, 1863, vol. ii. p. 303.
14	Curling	Strangulation persisted after herniotomy	"	Ibid., 1850, vol. ii. p. 81.
15	Depaul	Strangulation by a band	"	Whitall, loc. cit., No. 22.
16	Dieffenbach	Strangulation persisted after reduction of hernia	"	Operative Chirurgie (1848), Bd. ii., s. 439
17	Druitt	Strangulation by a band	"	Med.-Chir. Transactions, vol. xxxi. (1848) p. 245.
18	Dupuytren	" " "	"	Leçons Orales, 2e édit., t. iii. p. 650.
19	Erichsen	Volvulus	"	Lancet, 1850, vol. i. p. 108.
20	Fergusson	"	"	Med. Times and Gazette, 1862, vol. ii. p. 435.

[1] Med.-Chir. Transactions, vol. xxxi. (1848), p. 22.

[2] De a Gastrotomie dans les Étranglements Internes, Paris, 1872.

[3] New York Med. Journ., August, 1873, p. 113. [4] Loc. cit., p. 44.

No.	Operator.	Nature of lesion.	Result.	Reference.
21	Fergusson.	Adhesion of ileum to uterus	Died	System of Practical Surgery (1870), p. 651.
22	Fischer	Strangulation by omentum	Recovered	Adelmann, loc. cit., s. 46, Nro. 32.
23	Gay	Strangulation by a band	Died	Trans. Path. Society, London, vol. iii. p. 101.
24	Gross	Volvulus	"	System of Surgery (1872), vol. ii. p. 677, and private note from operator.
25	"	"	"	Ibid.
26	Hamilton	Scirrhus of colon	"	Med. Times and Gazette, 1854, vol. i. p. 88.
27	Hancock	Strangulation by a band	"	London Med. Gazette, vol. xii. (N.S.) p. 77.
28	Hilton.	Strangulation by old adhesions	"	Med.-Chir. Transactions, vol. xxx. (1847) p. 51.
29	"	Obturator hernia	"	Ibid., vol. xxxi. (1848) p. 323.
30	"	Strangulation by mesentery	"	Association Medical Journal, May 12, 1854, p. 408
31	Hoegg	Volvulus	"	Sandifort, Thesaur. Dissertat., vol. iii. p. 87.
32	Holmes	Strangulation by a band	"	Surgical Treatment of Children's Diseases, 2d edit., p. 570.
33	Hulke	" " "	"	Med. Times and Gazette, 1872, vol. ii. p. 482.
34	Jones	Strangulation persisted after herniotomy	"	Ibid., 1854, vol. ii. p. 182.
35	Larquet	Strangulation persisted after reduction of hernia	Recovered	Adelmann, loc. cit., s. 46, Nro. 33.
36	Lawson	Constriction by scirrhous mass	Died	Med. Times and Gazette, 1861, vol. i. p. 675.
37	Leopold	Strangulation persisted after reduction of hernia	Recovered	Adelmann, loc. cit., s. 44, Nro. 25.
38	Luke	Stricture of colon	Died	Trans. Path. Society, London, vol. ii. p. 218.
39	Manlove	Strangulation by old adhesions	Recovered	Boston Med. and Surgical Journal, vol. xxxii. (1845) p. 492.
40	Marcacci	Strangulation by a band	"	British Med. Journ., March 23, 1872, p. 314.
41	Monod	Constriction by scirrhous mass	Died	Archives Gén. de Médecine, 1838, t. ii. p. 455.
42	Pagenstecher	Obstruction by cyst of gall-bladder	Recovered	Archiv für klin. Chirurgie (Langenbeck), Bd. ii., s. 318.
43	Parise	Strangulation by a diverticulum	Died	Whitall, loc. cit., No. 28.
44	Pauli	Strangulation by omentum	"	Adelmann, loc. cit., s. 44, Nro. 17.
45	Phillips	"Ileus"	"	London Medical Gazette, vol. xiii. (N. S.) p. 233.
46	Pirogoff	Strangulation by a band	"	Adelmann, loc. cit., s. 44, Nro. 21.
47	Prieger	Strangulation persisted after reduction of hernia	Recovered	Ibid., Nro. 23.
48	Reall	Volvulus	"	Froriep's Notizen, 3 Reihe, Bd. ix. (1849) s. 95.
49	"	Obstruction by stick of wood in rectum	"	Prag. Vierteljahrschrift, Bd. xxvi. s. 50 (Analekten).
50	Renault	Strangulation persisted after herniotomy	"	Archives Gén. de Médecine, 1845, t. i. p. 458.
51	Reybard	Cancer of sigmoid flexure	"	Bulletin de l'Acad. de Médecine, t. ix. p. 1031.
52	Ritter	Volvulus	Died	Adelmann, loc. cit., s. 44, Nro. 29.
53	Tessier	Strangulation by a band	"	British Amer. Journal, vol. i. (1860) p. 251.
54	White	Obstruction by teaspoon in ileum	Recovered	Journal der praktischen Heilkunde, Febr. 1811, s. 124.
55	Wood	Strangulation persisted after reduction of hernia	"	Western Lancet, vol. xiv. p. 720.
56	.....	Obstruction from intestinal concretion	Died	Monro, primus, apud Jaeger; Adelmann, loc. cit., s. 42, Nro. 1.
57	.....	Strangulated hernia	Recovered	Blancard, apud Mém. de l'Acad. Roy. de Chir., t. iv. p. 337 (éd. 1819).

NOTE.—In addition to the cases given in the preceding table, there are others attributed to Dupuytren, Jobert (de Lamballe), Malgaigne, and Velpeau, which are rejected by Adelmann, but to the original reports of which I have not been able to refer. One of Dr. Whitall's cases (No. 16, Luke) I have omitted, as being rather an operation for the formation of an artificial anus than a laparotomy; it is properly tabulated by Adelmann among his cases of enterotomy. Cheselden's operation for scrotal hernia, described by Heister,[1]

[1] Inst. Chirurgicæ, tom. ii. p. 813 (Amst., 1739).

Haller,[1] and Louis,[2] as one of abdominal section, appears, from Cheselden's own account and illustration of it,[3] to have been a simple herniotomy. I must take this opportunity of expressing my thanks to Prof. Gross for having courteously furnished me with the particulars of his two cases of laparotomy for volvulus.

Of the fifty-seven cases included in the above table, it will be seen that only eighteen terminated successfully, so that the mortality of laparotomy in cases of intestinal obstruction other than intussusception, is over 68 per cent. But the prospect of recovery without operation is in these cases much less favourable than in those of intussusception, and in some instances, as *e. g.* in cases of strangulation by a fibrous band or diverticulum, or of protrusion of the gut through an aperture in the mesentery, the patient is, humanly speaking, inevitably doomed unless saved by the knife. Hence in any case of *acute* intestinal obstruction, in which judicious medical treatment has failed to give relief in the course of three or at most four days, and in which the age of the patient and the absence of the distinctive symptoms of invagination lead to the belief that the pathological condition present is one of intestinal strangulation (which, next to intussusception, is by far the most common cause of acute obstruction), it is, I think, undoubtedly the surgeon's duty to urge an exploratory operation as the only means of saving life.

From a study of the cases referred to in the preceding pages, the following conclusions may, I think, be considered as fairly established.

I. Past experience gives no encouragement to operative interference in cases of intussusception occurring in infants less than one year old.

II. When the symptoms present, and particularly the existence of intestinal hemorrhage, render it probable that the closeness of the intussusception will lead to sloughing of the invaginated portion, no operation is advisable; for while under these circumstances an operation would almost surely fail, there is a fair hope that separation of the invaginated mass may lead to spontaneous recovery.

III. There may be, however, exceptional cases, in which, while there is no prospect of recovery through sloughing, bloodless remedies fail to give relief, and the patient is in danger of succumbing through exhaustion and long-continued suffering; under such circumstances, if the age and general condition of the patient do not forbid it, the question of operative interference may properly be considered.

IV. When an operation is determined upon, *laparotomy* should invariably be preferred to either *enterotomy* or *colotomy;* these, though suitable operations in cases of congenital occlusion and chronic obstruction

[1] Bibliotheca Chirurgica, tom. ii. p. 23 (Basileæ, 1775).

[2] Mém. de l'Acad. Royale de Chirurgie, t. iv. p. 336 (Paris, 1819).

[3] Anatomical Tables, Tab. 39, p. 44 (Boston, 1796); and Treatise on the High Operation for Stone, Tab. xvii., p. 178 (London, 1723).

of the bowels, are unsuited for cases of intussusception or other varieties of acute obstruction.

V. In cases of acute intestinal obstruction from other causes than intussusception, should milder measures fail to give relief in the course of three or at most four days, laparotomy should be unhesitatingly recommended, and may under such circumstances be resorted to with a reasonable hope of success.

ART. V.—*On Thrombosis of the Cerebral Veins, and Sinuses of the Dura Mater.* (Second paper.) By JOHN A. LIDELL, M.D., of New York.

III.—THE traumatic and inflammatory forms of this disease, or rather the clinical history of these forms, were minutely described in the number of this Journal for January, 1874. There is, however, still another variety of thrombosis of the cerebral veins and sinuses of the dura mater, which possesses a great deal of interest and importance. It is met with only in subjects who are much weakened from want of food, or loss of blood, or profuse discharges, or broken down by the weight of years, or worn-out by some exhausting disease, that is, in marasmic subjects, without the concurrence of any local traumatic or inflammatory lesion to which the origin of the thrombus can be ascribed, and hence we have, in the *third* place, a *marasmic* variety of thrombosis that affects these veins and sinuses. It is strictly analogous to the marasmic variety of thrombosis, which sometimes presents itself in the veins of the extremities. It is of pretty frequent occurrence. It embraces rather more than one-fourth of the cases collected by Prof. Von Dusch; and almost one-fourth of those collected by the writer. It is important not only from the frequency of its occurrence, but when we closely examine the individual instances of it, and especially when we contrast them with the cases which belong to the other varieties of cerebro-venous thrombosis, we find important differences as well as numerous other points of interest. In the writer's opinion the *marasmic*, as well as the traumatic and inflammatory varieties of cerebro-venous thrombosis, has not yet received that degree of attention which it really deserves. He therefore proposes to describe it also, as fully as he can, within reasonable limits; and this description will be chiefly drawn from the history of thirty-eight cases, of which one was observed, and twenty-one were collected by Von Dusch, and an additional sixteen were observed or collected by the writer. It may here be remarked that Von Dusch styles this variety of cerebro-venous thrombosis "*thrombosis of the sinuses from debilitating influences.*" The term *marasmic* thrombosis of the above-named vessels, however, is preferable in a vast majority of instances.

1. Perhaps the most striking of all the cases belonging to this category, are those in which young children having diarrhœa, or dysentery, or cholera infantum, but especially those who are badly nourished, or have become much debilitated and shrunken in appearance from the profuseness or long-continuance of alvine discharges, rapidly sink into a state of unconsciousness, with or without convulsions, and thus after a time expire. Dr. Gerhardt (*Von Dusch's Memoirs*, New Sydenham Soc. Ed., pp. 111–114) relates four cases of this sort. They all occurred in very young, artificially fed children, and agree very closely with each other. Take the following as a fair example of the clinical phenomena and post-mortem appearances.

A well-fed boy, three months old, was seized with profuse diarrhœa; greater fontanelle flat, and pulsating strongly; temporal and frontal veins very prominent; both jugulars much and equally distended. He lies quietly, with an unconscious stare, and occasional strabismus; both pupils equally dilated. Then there followed complete unconsciousness, opisthotonos with rigidity, sinking of the fontanelles, overlapping of the skull bones, convergent strabismus, etc.; the left external jugular became more distended; then the right external jugular enormously so, while the left one appeared almost empty; left side of face slightly paralyzed; left pupil more dilated; after some transient improvement, death on the eleventh day. *Autopsy.*—Superior longitudinal sinus, filled with fluid blood and recent coagula, anteriorly. A knobby, discoloured, firm thrombus in posterior part; it also extends into both lateral sinuses, and causes them, especially the left, to appear externally like thick, roundish hard cords; in the left it is partially adherent, and completely fills the sinus; in the right not. Hyperæmia of pia mater, and gray substance; extravasation beneath scalp, at back part of head; bones of skull very hyperæmic in same situation; pneumonia patches in both lungs; usual condition of intestine. (*Ibid.*, p. 112.)

Another case was that of a little girl, aged eleven months, who sank into stupor and died, after only three days' vomiting and diarrhœa. The skull bones overlapped, and the nape muscles were contracted. On *autopsy* the straight and both lateral sinuses we found plugged up with a crumbling, adherent, symmetrically formed thrombus, while the brain, pia mater, and plexuses were hyperæmic and œdematous. No other lesion was revealed that would account for the head symptoms and the fatal issue. It is not improbable that the following case, which occurred in the writer's practice, belongs to the same category as the above:—

CASE LV.—The patient, a pale-looking little boy, aged about two and a half years, had dysenteric diarrhœa. The disease appeared to readily yield to the treatment employed, which consisted mainly in a carefully regulated diet, confinement to bed, poulticing the bowels, and administering calomel with Dover's powder in small doses, alternated occasionally with ol. ricini as a laxative. At the end of about the third day he was free from fever, his pulse and skin had become natural, his countenance bright though pale, his stools much less frequent, and more natural in appearance, and I expected he would make a speedy recovery. The next morning, however, I found him lying in a state of profound stupor, with dilated pupils, and a very pale face, I learned that the diarrhœa had given no trouble through the night, and that he was discovered to be insensible on trying to waken him in the morning. He sank rapidly, and died comatose, in the evening. No *autopsy*. His appearance was quite anæmic at the outset of his attack. It should also be stated that he had recently crossed the ocean from Europe with his parents, who were trades-people in moderate circumstances. This voyage, with the insufficient feeding for an infant likely

to attend it, may have had something to do in producing the anæmic state which was already present when the diarrhœa appeared. Now, although no autopsy was allowed in this case, I infer from the nature of his disease, from the morbid state of his blood, from the sudden appearance of stupor and coma, and from the post-mortem lesions which have been found in strictly analogous cases, that this little patient too had thrombosis of the sinuses of the dura mater which caused the coma and the fatal result.

With regard to the causation of the thrombi, and the interpretation of the clinical phenomena in cases such as the above, Dr. Gerhardt has offered a very reasonable, and upon the whole a very satisfactory theory, which is in substance as follows:—

The profuse discharge of fluids which not unfrequently attends the diarrhœa, as well as the cholera of infants, necessarily lessens the quantity of the blood, and produces inspissation of it. At the same time absorption of the parenchymatous fluid takes place throughout the substance of the organs in general, but especially in that of the very watery brain of infants. In consequence of this the contents of the skull become correspondingly diminished in volume, whereby the atmospheric pressure causes, first, depression of the fontanelles, and afterwards, when this no longer suffices, overlapping at the sutures. If this compensation also prove insufficient, a distension of the vessels of the brain and its meninges occurs; and the diminution of the general mass of the blood, the lowering of the power of the heart, and the inspissation of the blood itself, all tend to retard the current, that is, to produce stagnation, and lead to the formation of coagula in a locality so favourable as the sinuses of the dura mater. The unequal prominence of the jugular veins is a natural consequence of the obstruction of one of the lateral sinuses with coagulum, inasmuch as the vein corresponding to the obstructed sinus will be less full than the other. This phenomenon, which must be most strongly marked in the deep lying internal jugular vein, also shows itself by a circuitous route in the external jugular of the same side.

The observations of Dr. Gerhardt and others, render it pretty certain that in cases of cholera infantum and other diarrhœal diseases of children, where loss of consciousness, and other head symptoms suddenly and unexpectedly present themselves, the cerebral phenomena are due to the obstruction of the sinuses of the dura mater with coagula, much oftener than is generally supposed.

2. But thrombosis of the cerebral veins and sinuses of the dura mater not unfrequently occurs in children suffering from other diseases, especially those of a chronic and exhausting character. Thus, Prof Von Dusch relates the case of an infant, aged nine months, which came under his own observation.

The little patient was teething, and much debilited by the discharge from a large abscess of the thigh. Death was preceded by great collapse, without convulsions. The superior longitudinal sinus was found completely filled anteriorly by a firm, three-cornered, pale clot of blood, that adhered to its walls, and was laminated in structure. The veins emptying into this sinus also contained tough, firm, colourless clots. Besides, the same writer has collected five other juvenile cases, in which the marasmic variety of cerebro-venous thrombosis appears to have been the immediate cause of death. One of them was a child, aged two years, "which had long been very weakly;" another was a little girl, aged four years, who had strumous ophthalmia, with swelling of the glands, and pneumonia; the third a boy, aged fourteen years, who suffered from ague-cachexia, with œdema of the limbs, enlargement of the liver and spleen, diar-

rhœa, etc.; the fourth a boy, aged fifteen years, who had for several months suffered from pleurisy, with œdema of the feet, and dyspnœa; and the last, a girl, aged twelve years, suffering from typhoid fever, one month advanced in its course.

Dr. West (*Lectures*, etc., pp. 108, 109, 4th Am. ed.) relates a case in which the cerebral veins and sinuses of the dura mater were extensively obstructed with thrombi, and death appeared to have resulted therefrom.

CASE LVI.—The patient was a little girl, aged about thirteen months, who had sunk into a state of marasmus after an attack of scarlet fever. "No new symptoms came on till she was suddenly seized with extreme faintness, amounting to almost perfect syncope. She rallied, however, under the use of stimulants; but, forty-eight hours afterwards, the faintness returned, and terminated in death, without any convulsion having preceded it." On *autopsy*, the posterior half of the longitudinal sinus, the torcular, the left lateral, and left occipital sinuses were found blocked up with fibrinous coagulum, and their walls were thickened, etc. The ventricles contained a considerable quantity of fluid. There was great venous congestion beneath the middle lobe of the left hemisphere; the cerebral veins in that situation were distended with coagulum, and their coats were thickened. In the left middle lobe, towards its anterior part, were also four recent extravasations of blood, each of which was connected with an obstructed and distended vein. The largest clot extended an inch into the cerebral substance; the others were of smaller extent.

The cerebral hemorrhage constitutes an important feature of this case. It was obviously due to the occlusion of certain of the cerebral veins with thrombi. The blood brought into the brain by the arteries escaped into the cerebral substance, because it could not find its way out again through the obstructed veins. Moreover, this hemorrhage was, in all probability, the immediate cause of the faintness or syncope which terminated the patient's life.

Concerning the diagnosis of cerebro-venous thrombosis Dr. West justly observes that we are not acquainted with any symptoms which are pathognomonic of this affection; but when head-symptoms suddenly present themselves in debilitated or cachectic children and do not run the course of any ordinary form of cerebral disease, such symptoms will probably be found to be due to the formation of blood-clot in the cerebral veins or sinuses.

Dr. Bouchut, an eminent authority on the subject of thrombosis, relates (*Journ. f. Kindk.*, 1868) the two following cases, which serve to still further illustrate the clinical relations and phenomena of the marasmic variety of cerebro-venous thrombosis when it occurs in children:—

CASE LVII.—A little girl had suffered for several months from hooping-cough. Broncho-pneumonia ensued; incomplete anæsthesia attended, which quickly deepened into a condition resembling asphyxia. Then convulsions, lasting four hours, set in, were repeated twice on the same day, and led to death. The autopsy revealed considerable brain-congestion, and a small quantity of serous effusion in the pia mater under the arachnoid; besides, old coagula were found in the sinuses of the dura mater; these thrombi were hard and colourless, and one was fifteen centimetres in length; it extended along the lateral sinus, and reached the mouth of the jugular vein. Another thrombus, still harder and paler, lay in the superior longitudinal sinus. It had grown fast to the walls and completely obliterated the sinus.

CASE LVIII.—Another case was that of a phthisical child, in whom thrombosis of the cerebral sinuses induced delirium twelve hours before death. The ophthalmoscope revealed a gray papilla, surrounded apparently by œdema. The boundaries were not recognizable, and were rather surmised from the puncta around which the veins radiated. The vessels were large and pale; the choroid also was very pale, and, like the retina, looked as if covered with fine white sand. The cause of the delirium was sought for in the sinuses of the dura mater, and the associated atrophy. The accuracy of this diagnosis was confirmed by autopsy. Tubercles and cavities were found in the lungs. The longitudinal and transverse sinuses of the dura mater were completely closed by blood-plugs, of which some were old, whitish, firm, and more or less adherent to the walls, whilst others were still fresh, blackish, soft, and had clearly been formed in the last moments of life. The brain and its membranes were sound. On examining the eyes there was seen, through the retina, close around the papilla, a rosy areola beset with red puncta. After removing the retina it was easily seen that the vessels of the choroid were filled with blood. The inner layer of this membrane had quite vanished, a few cells only were seen, and these had degenerated into fat. The pigment-cells of the lamina were quite gone, or were atrophic. The sand-like appearance seen with the ophthalmoscope before death was only an optical illusion, and was plainly due to the want of pigment in the choroid. (*New Sydenham Soc. Retrospect*, 1867–1868, pp. 426, 427.)

The latest clinical observations of Bouchut teach that, in cases where, after long chronic diseases, children die in convulsions or delirium, we should look for thrombi in the great veins of the brain and its membranes. He also recalls to mind how many chronic diseases of children terminate in convulsions. As a rule, they are the forerunners of death. Many children thus die in the course of marasmus brought on by lung-phthisis, simple, chronic, and tubercular enteritis, vertebral caries, white swelling of the joints, hooping-cough complicated with broncho-pneumonia, etc. It was long believed that the delirium and convulsions which appear at the end of such chronic diseases were simply the result of impoverishment of the blood. Most physicians think that inanition and chlorosis are the consequences of the cachectic state, and that the cachexia itself is developed through the protracted disease of the infant organism. This is generally true, and Bouchut recognizes the correctness of Marshall Hall's explanation of hydrencephaloid.

But there are cases, he says, such, for example, as the above, in which the loss of consciousness and convulsions result from a quite different cause. In them the formation of thrombi in the sinuses of the dura mater, which obstruct the flow of blood from the brain, produces passive congestion of the brain-substance, and impaired nutrition of the nerve-fibres and ganglion-cells. For when the venous blood does not flow out of the cerebral capillaries the fresh arterial blood which is necessary to the performance of the function of nutrition cannot pass into the cerebral capillaries so as to reach the histological elements of the cerebral substance and maintain their functional activity and integrity. Whenever this form of passive congestion of the cerebrum is excessive and not compensated for, the ganglion-cells and nerve-filaments of the cerebrum lose their functional activity, and loss of consciousness ensues; and the loss of consciousness may be partial or complete; it may be stupor on the one hand, or coma on the other, according to the degree of the passive con-

gestion, or the completeness with which the escape of venous blood from the brain-substance is prevented by the presence of coagula in the cerebral veins and sinuses of the dura mater. Finally, in some cases where at first the passive congestion of the brain-substance is not severe enough to produce stupor or convulsions, it may so modify the nutrition of the brain-substance as to induce delirium.

Dr. M. E. Fritz (*Bulletins de la Société Anatomique de Paris*, 1860, pp. 70–73) relates a very instructive case of marasmic thrombosis of the cerebral veins and sinuses of the dura mater, of which the following is an abstract:—

CASE LIX.—A boy, aged 11, an inmate of the Hôpital des Enfants, had Pott's disease of spine, with profuse purulent discharge, and was becoming much debilitated, when he was suddenly seized, August 28th, with vomiting, headache, and drowsiness. On August 29th he was found in bed lying on his back, with shrunken features, moaning, and unconscious; eyes convulsed, axes divergent, pupils dilated; lower extremities contracted; pulse slow and irregular.

August 31. Profound coma; afterwards profuse sweats limited to face, neck, and upper part of chest.

September 4. He had convulsions in the morning, and died comatose at 8 in the evening.

Autopsy.—Brain very soft, almost diffluent; arachnoid raised up by a serous fluid, containing some gelatinous flocculi. Four or five cerebral veins (superior and anterior, on both sides) were distended and plugged up to the extent of several centimetres, next to the sinus, with blackish-brown, tolerably dry, and elastic coagula; cerebral veins generally much gorged with blood. The vein-clots were continuous with a thrombus which occupied the superior longitudinal sinus through its whole length. In anterior half of sinus the thrombus was dark-brown; back of that, grayish-white, spotted with red externally, and of the colour of wine-lees at the centre, adhering pretty closely by its outer layers to the fibrous bands of the sinus; still further back it became thin, no longer filling up the calibre of the sinus, and its extremity was prolonged a little into the torcular Herophili. The walls of the sinus nowhere presented an inflamed appearance, being smooth and not injected. The left lateral sinus also contained a small coagulum, similar to the above.

The light-coloured part of the thrombus, under the microscope, was found to consist of granular fibrin, mingled with a great number of leucocytes, some oil-drops, and red globules more or less altered. These facts showed that the coagulation was not very recent.

Dr. M. E. Fritz (*Ibid.*, pp. 75–77) relates another very interesting case of infantile marasmic thrombosis of the cerebral veins and sinuses of the dura mater. The following is a condensed account of it:—

CASE LX.—A little boy, aged 3½ years, entered the Hôpital des Enfants January 5, 1859, for prolapsus of rectum of six months' standing. Badly nourished and living in misery he had had measles and smallpox in the last six weeks; and a few days before admission he was seized with hooping-cough. He was very pale and feeble, but without fever; the fits of coughing were pretty frequent, and terminated by vomiting. January 7. Symptoms of capillary bronchitis. January 8th and 9th. He was extremely prostrated and unable to sit up; face extremely pale. On the evening of the 9th he became delirious. On the morning of the 10th he was much sunken, and did not reply to any question. His general sensibility was blunted, but not extinguished; breathing difficult and oppressed. During the day strabismus appeared. In the evening pulse 180 and very small. He died on the 11th.

Autopsy.—Visceral arachnoid considerably elevated by serum. Cerebral veins gorged with black blood; superior longitudinal sinus contained, besides some liquid blood and soft black coagula, a fibrinous concretion which extended

its whole length. It adhered to the walls, which were entirely normal, by some prolongations that entwined themselves in the trabeculæ of the angles. It nowhere completely obliterated the calibre of the sinus. At the posterior extremity it was cylindrical and had a diameter of four millimetres; at the middle it was ribbon-shaped or flattened; at the anterior extremity it terminated in a point. It sent prolongations into many veins along the sinus. The calibre of these veins was thus almost completely obliterated. The right lateral sinus was occupied by a similar concretion, nine centimetres long by about four millimetres thick. The middle lobe of right lung presented numerous spots of atelectasis, accompanied by capillary bronchitis with thick purulent secretion.

These two cases differ from each other very much in respect to the symptoms referable to cerebro-venous thrombosis which presented themselves during life. In the first of them the attack came on suddenly with vomiting, headache, and drowsiness. There followed convulsive movements of the eyes, with dilated pupils and divergent strabismus, profound coma, general convulsions, and death. In the other, the earliest head-symptom was delirium. Towards the end, however, strabismus appeared, but there were no general convulsions. These cases also differ from each other equally much in respect to the coagula which were found in the cerebral veins and sinuses of the dura mater, on autopsy; for in the first case the thrombus was large enough to fill up the calibre or completely obstruct certain of these vessels, while in the other the thrombus was not large enough to entirely occlude any of these canals. Dr. Fritz's cases, therefore, strongly support the views of Bouchut, expressed above.

These thrombi also differed from each other a good deal in other particulars besides their size, which will readily suggest themselves to the reader, and thus render it unnecessary to spend much time in their discussion in this place. One point, however, requires special mention, namely, in the first of these cases the great thrombus which occupied the superior longitudinal sinus was unmistakably formed at two distinct epochs. In the anterior half of this sinus it was dark-brown in colour, and resembled a recent blood-clot in appearance. In the posterior half it was grayish-white in hue, and much older in appearance, having existed long enough to become decolourized, as was shown by the broken-down and disintegrated condition of the red corpuscles belonging thereto, which was revealed by the microscopical examination. Besides, it is worthy of remark, that the walls of the thrombosed vessels did not show any signs of inflammatory action in either case.

Dr. Crisp (*Tansact. Patholog. Soc. of London*, vol. x. pp. 117, 118) has related the following remarkable instance of what appears to be idiopathic thrombosis of the cerebral veins and sinuses of the dura mater:—

CASE LXI.—The patient was a girl, aged 16, who died after about fourteen days' illness. The symptoms were headache, confusion of intellect, and vomiting, followed by hemiplegia of right side, loss of speech and of power to protrude the tongue, and inability to pass water. Death was preceded by coma. No cause for her attack could be assigned.

Autopsy.—The superior longitudinal sinus was filled with coagulated blood,

interspersed with portions of fibrin closely adhering to the walls thereof. The superior cerebral and cerebellar veins were also extensively thrombosed. The superficial cerebellar veins were nearly all plugged with fibrinous coagula, and all the cerebral veins entering the superior longitudinal sinus were firm and cord-like from the same cause. The upper and lateral portions of the arachnoid were opaque on both sides. The pia mater was rather vascular. The lateral ventricles contained about two teaspoonfuls of reddish serum, and about the same quantity was found under the arachnoid at the upper part of the spinal cord.

The autopsy does not appear to have revealed any cause to which the death of this young girl could be ascribed, other than spontaneous coagulation of the blood in the veins and sinuses belonging to her brain. How does cerebro-venous thrombosis arise in such cases? First of all, the blood itself must be in a condition to readily coagulate, that is, the blood must be more coagulable than natural, or in a morbid state whereby its coagulability is greatly increased. Besides, a protracted stasis of the blood in these vessels, such as might readily attend a passive congestion of the brain, and perhaps also an expanded condition of the cerebral veins and sinuses, such as might be induced by a vaso-motor paralysis of these vessels, would, if present, determine the occurrence of the coagulation. It is not impossible that all these causes combined to produce the thrombosis in the above case.

Dr. Andrew (*Transact. Patholog. Soc. of London*, vol. xvi. pp. 27, 28) has reported an exceedingly interesting case of cerebro-venous thrombosis, which in many particulars resembles the one last related. It illustrates in a striking manner the clinical history and post-mortem appearances of the marasmic variety of this disorder when it occurs in anæmic young women.

CASE LXII.—Eliza S., aged 20, admitted to St. Bartholomew's Hospital March 29, 1865; had enjoyed good health up to twelve months before, when, without apparent cause, her catamenia suddenly ceased, and she began to suffer from anæmia. On admission she was very feeble and anæmic; ankles œdematous; pain in left side; anæmic murmurs in neck, etc. She complained of slight headache, at first frontal, which gradually became more intense, so that on the night of April 3d it kept her awake. On April 4th she vomited several times, and was delirious during the night. On the 5th she gradually became insensible and comatose; pulse 90–120, and slightly irregular. On the 6th, at 10½ A. M., she died.

Autopsy.—Cerebral convolutions flattened, particularly on right side, and marked by impress of the fibres of dura mater. A dark clot, the size of a pea, in posterior part of each hemisphere about half an inch from upper surface. Considerable blood-stained fluid in each lateral ventricle, also a long thin dark clot in right one, lying upon the corpus striatum and optic thalamus. Septum lucidum entire, but soft. Optic thalami unusually prominent; on section, they are found to be œdematous, and studded with numerous small dark clots, by which their substance is broken down, but these changes are more marked in the right than in the left one. The veins of the choroid plexus and velum interpositum, also the venæ Galeni, are distended with firm, partly yellow, fibrinous coagulum. It extends continuously along the straight sinus, and about an inch into the lateral sinuses, but rather further down the right than the left one. It does not completely fill up the calibre of the lateral sinuses, whilst the straight sinus and the tributary veins are greatly distended thereby. The oldest part of the thrombus was found at the junction of the

straight with the lateral sinuses. Here it was of a dull pinkish tint, and somewhat soft. In the other sinuses the blood was almost entirely fluid. Cerebral arteries not diseased. Cerebral substance throughout rather soft and watery. No tubercle in any organ. In each lung several branches of the pulmonary artery were obstructed by old clots, some of which were breaking down at the centre. Beneath endocardium of left ventricle (which was firmly contracted) were numerous large ecchymoses.

The symptoms referable to thrombosis of the cerebral veins and sinuses of the dura mater, which this patient exhibited, were headache, gradually increasing in severity, vomiting, delirium, stupor, coma, and death. Moreover, this disorder appears to have run its whole course in three or four days.

The autopsy revealed cerebral hemorrhage, cerebral œdema, ventricular effusion, and obstruction of the veins of Galen, velum interpositum, and choroid plexus, as well as the straight and lateral sinuses with fibrinous coagulum. But the oldest part of the thrombus was found at the junction of these sinuses. This circumstance shows that the coagulation began in a portion of the cerebral sinuses where the calibre is widely expanded, where the blood-stream is usually sluggish, and where the blood itself would be likely to stagnate on lessening much the power of the heart and arteries to carry on the circulation. The extravasations of blood, which, by the way, were very numerous, the œdema of the cerebral substance, and the effusion into the ventricles, were clearly due to the blocking up of the straight sinus and the tributary veins with thrombus.

It is also worthy of special mention that this young woman was very pale, feeble, and anæmic; that her ankles were œdematous; and that she had anæmic murmurs in the neck ere she was attacked with cerebro-venous thrombosis. In other words, the occurrence of this disorder was preceded by undoubted evidence of blood-disease. In all probability this blood-disease was the principal cause of the thrombosis; for the anæmia or chlorosis doubtless was attended with much diminution in the quantity of red corpuscles and much increase in the white ones, and from this change in the composition of the blood there resulted a considerable increase in its coagulability.

Again, anæmia and debility the result of *excessive bloodletting* sometimes lead to coagulation of the blood in the cerebral veins and sinuses of the dura mater, especially in persons who are predisposed to this disorder. It is scarcely necessary to say that these cases are very important in a practical point of view. Von Dusch presents two rather striking instances, of which the following is a brief account:—

A lying-in woman, aged 23, was attacked by peritonitis twice during the first week after delivery, for the cure of which copious local bleeding was repeatedly employed during nine days. Twice, forty leeches were applied, and, on two other occasions, twenty, making in all one hundred and twenty leeches. A fortnight after delivery headache and vomiting appeared, followed by hemiplegia. Great restlessness and screaming supervened, then coma, and finally, death three weeks after delivery. It must be added that, in consequence of the new symp-

toms, she was bled once in the arm, and had fifteen more leeches applied on various occasions.

Autopsy.—The superior longitudinal sinus was seen to be very much distended, and of a glittering blackish appearance. It was filled up by a thrombus, in the centre of which there was a puriform fluid, resembling wine-lees. The right lateral sinus also was blocked up, in the direction of the jugular vein, by a firm coagulum which contained a similar fluid. The other sinuses were quite normal. There were ecchymoses in the gray matter on the surface of the brain, especially in the course of the thrombosed veins on the convex surface and at the base. In the true pelvis two collections of pus were found, and, in the veins of the uterus, corresponding to the place where the placenta was attached, very firm, small, black plugs. In the chest there was nothing abnormal (*op. cit.*, 108).

In this case thrombosis of the cerebral veins was the cause of death. It occurred because the coagulability of the blood was greatly increased on the one hand, and the heart-power was greatly diminished on the other. The abnormal coagulability of the blood, however, was due in part to the puerperal condition of the patient, and in part to the excessive losses of blood by leeches and venesection to which she was subjected, for it is well known that the puerperal state is usually attended with a considerable increase in the coagulability of the blood as a consequence of hyperinosis, and that copious bloodletting generally causes a great increase in the coagulability of the same fluid. But excessive bloodletting also weakens the action of the heart, and thus assists more or less strongly in producing cerebro-venous thrombosis in such cases as the foregoing.

The other case claims affinity to the last in one important respect, namely, in it the formation of thrombus in the sinuses of the dura mater was also due, to great extent, to colossal bloodletting.

A soldier received a gunshot wound of the left parietal bone, which produced fracture with depression. The symptoms which supervened rendered trephining necessary. The patient was also bled five times in a short period. Death occurred on the thirteenth day.

Autopsy.—Fleshy coagula were found in the left lateral sinus, and smaller ones of similar appearance in the superior longitudinal and right lateral sinus. There were also fracture of the inner plate and purulent arachnitis (*op. cit.*, pp. 109, 110).

If in this case the formation of the thrombus had been induced by the arachnitis, one or more of the contiguous veins of the pia mater would pretty certainly have been found thrombosed, and, in all probability, the thrombus itself would have been discovered to be broken down, and undergoing puriform softening, as usually obtains in venous thrombosis connected with suppurating parts. It is therefore highly probable that the arachnitis had but little, if anything, to do with the production of the thrombosis. However, the injury itself, and the operation of trephining, doubtless were concerned in producing it; but this circumstance should not lead us to overlook the influence which five venesections, all performed within a short period, must exert in the way of increasing the coagulability of the blood, thereby promoting the occurrence of venous thrombosis in the neighbourhood of the injured part; besides, these venesections must

have weakened the heart-power considerably. We must therefore look upon excessive loss of blood by venesection as an important, if not the chief, cause of the thrombosis of the cerebral sinuses which occurred in this case, and its importance, in a practical point of view, is not diminished by the fact that it was entirely preventable.

The *syphilitic cachexia*, and syphilitic diseases of the brain or its membranes, are sometimes attended by the formation of coagula in the cerebral veins and sinuses of the dura mater, whereby these vessels become more or less completely obliterated. Von Dusch does not mention this form of cerebro-venous thrombosis. It is, therefore, incumbent upon us to give particular attention to this point. Dr. Murchison (*Transact. Patholog. Soc. of London*, vol. xiii. pp. 250–253) has reported two cases, one of which certainly, and the other probably, comes under this head. The following is a much condensed account of them :—

CASE LXIII.—The subject was a woman, aged 27, who died of syphilitic cachexia, at the Middlesex Hospital. After complaining of vertigo, dimness of sight, and headache for a time, she got epileptic fits, but her consciousness remained clear almost to the last. On *autopsy* there were found extensive syphilitic deposits on the dura mater, moderate injection of the pia mater, numerous puncta vasculosa, and thrombosis of the sinuses of the dura mater, in addition to other lesions. The sinuses were full of dark soft coagulum.

The writer infers from the symptoms which presented themselves during life, and from the appearances which the thrombus exhibited at the autopsy, that it was formed during the closing hours of life. Nevertheless, it may have played an important part in producing the fatal result.

CASE LXIV.—The other patient was also a woman, aged 36, who, after having had repeated attacks of copper-coloured eruptions, periostic nodes on cranium, intense pain in forehead and occiput aggravated at night, was attacked with "fits" and died a fortnight later at the Middlesex Hospital. The "fits" commenced with a scream, and were attended with loss of consciousness, but not by foaming at the mouth, nor by convulsive movements. The "fits" increased in frequency and severity until she died, while, in the intervals, she had intense pain in the forehead and occiput.

Autopsy.—Pericranium thickened in spots. Bones of skull generally thicker and denser than natural, etc. While removing the brain the left hemisphere of the cerebellum was found so firmly adherent to the dura mater, that a portion was torn off and left behind. The dura mater in rear of the petrous portion of temporal bone, and on the occipital as far as the mesial line, was greatly thickened by the deposit on its inner surface of flattened masses of a firm yellowish-white substance, exhibiting a smooth surface on section, and yielding no juice. This deposit extended at some places fully half an inch under the tentorium at its attached margin. The left lateral sinus passed through the diseased mass, and its canal was quite obliterated. There was an evident connection by continuity between the disease of the dura mater and the periostic nodes external to the bone.

It seems highly probable to the writer that in this woman's case the obliteration of the left lateral sinus was effected through the agency of a thrombus, and that the formation of the thrombus itself was due in part to syphilitic pachymeningitis and in part to syphilitic cachexia.

Analogous in some respects to the last group are those cases wherein a *fungous tumour of the dura mater* causes the blood to coagulate in one or more of the cerebral sinuses.

Mr. Forster (*Transact. Patholog. Soc. of London*, vol. ii. pp. 162, 163) has recorded the following case in which thrombosis of the right lateral sinus resulted from the above-mentioned affection of the dura mater:—

CASE LXV.—A strumous lad, aged 18, was knocked down by a cab, and struck on the right side of his head nineteen months before death. Soon afterwards he became deaf and suffered severe pain. The part became slightly swollen and excessively tender, especially over the mastoid process; paralysis of the right facial nerve also took place. No great change occurred until the last six months, when from another blow on the same spot, the disease grew more active. The side of his head from above the temporal ridge to two inches below the ear, became enormously enlarged and tender; the external ear appeared to be pushed away from the side of his head. He experienced great difficulty in swallowing solid food, and was also unable to speak. About two months before death the swelling began to fungate and slough. Profuse hemorrhage occurred at intervals. The sloughing extended very rapidly, and at last laid the pharynx bare. No brain symptoms appeared. The hemorrhage and the suppuration, which also was profuse, quickly destroyed him.

Autopsy.—The tumour which caused the swelling was developed from the dura mater. The temporal bone was carious and extensively destroyed in consequence of the pressure exerted by the tumour. No vestige of meatus or mastoid cells could be found. The lateral sinus was filled with a coagulum.

No head-symptoms resulted from the thrombosis in this case because it was limited to one lateral sinus, and, therefore, the blood could for the most part, readily find its way out of the brain through the other lateral sinus, etc.

In cases such as this it has been customary to ascribe the formation of thrombus to compression of the affected sinus resulting from the growth of the tumour. Von Dusch (*op. cit.*, p. 103) quotes a case from Virchow, in which there was a large cholesteatoma in the left petrous bone, and at the same time thrombosis of the left lateral sinus, etc.; but the patient had also had otorrhœa for twelve months, and when we consider the intimate relationship which has in another place been shown to exist between disease of the internal ear and thrombosis of the corresponding lateral sinus, we are lead to refer the causation of the thrombosis in Virchow's case to the ear-disease quite as much as to the tumour. Indeed, Von Dusch perceived this point, for he remarks that although the formation of thrombus in the cerebral sinuses as a consequence of compression, etc., seems *a priori* very probable, "the few cases to be met with in the literature of the subject for the most part indicate other sources." So too in the case related above, the writer thinks that the formation of the thrombus should be attributed to the marasmic state of the patient which resulted from the hemorrhages and the suppuration, rather than to any diminution in the calibre of the sinus which may have been produced by the fungous growth.

Anæmia and debility, the result of *chronic disease of the rectum*, sometimes proves fatal by inducing cerebro-venous thrombosis. Dr. Ogle (*Transact. Patholog. Soc. of London*, vol. vi. pp. 31, 32) has reported a case of this sort, in which several cerebral veins and sinuses of the dura mater were occluded by dense fibrinous clots that were traceable to a spon-

taneous tendency in the blood to the deposition of fibrin. The following is a brief abstract thereof:—

CASE LXVI.—The patient was a woman, who gradually sank in St. George's Hospital, whither she had been brought for long-continued disease of the rectum. The symptoms exhibited towards the close of life were those of asthenia, and nothing pointed to disease of the brain, excepting that a short period before death, she completely lost the faculty of speech, the mind being unaffected.

The *autopsy* showed the presence of much blood-stained fibrin which blocked up the left lateral sinus, the inferior longitudinal sinus to a certain extent, the straight sinus, most of the venæ Galeni, the left petrosal sinus, and several veins which pass into the above-mentioned sinuses from the sides and base of the cerebral and cerebellar hemispheres. The coagulum did not extend beyond the posterior jugular foramen. The subarachnoid tissue and the ventricles contained much fluid, but the substance of the brain and its membranes were natural. No marked lesion of any organ excepting the rectum was found, and no collection of purulent matter existed in the body.

Other exceedingly chronic diseases may in adults, as well as in children, as we have elsewhere shown, so far as the latter are concerned, bring about a state of marasmus with increased coagulability of the blood and the formation of thrombi in the cerebral veins and sinuses of the dura mater. Von Dusch (*op. cit.*, pp. 107, 108) presents a case in point, wherein a man, aged 53, who had old hepatic and renal disease, with cough and copious expectoration, ascites, anorexia, and loss of strength, got diarrhœa with involuntary evacuations, accessions of unconsciousness, and thus died. On *autopsy* there were found cirrhosis of the liver, degeneration of the kidneys with cysts and concretions, thrombosis of the superior longitudinal sinus and of some of the corresponding veins of the pia mater, etc. The lungs were œdematous, and the pulmonary arteries contained obstructive plugs. Again we remark that any chronic disease which produces a cachectic state, and increases the coagulability of the blood as well as weakens the action of the heart and arteries, may in like manner lead to cerebro-venous thrombosis in adults as well as in children.

But diseases which run a comparatively short course—diseases which are by no means chronic—such for example as pneumonia, pleurisy, typhoid fever, etc., may also cause the blood to become abnormally coagulable and clots to form in the cerebral veins and sinuses of the dura mater in both adults and children. The following case reported by Dr. Ogle (*Transact. Patholog. Soc. of London*, vol. x. pp. 30, 31) comes under this head:—

CASE LXVII.—A man, aged 26, entered St. George's Hospital for pneumonia of left side (a relapse?). His pulse was very feeble and debility great. Afterwards he complained of intense pain in the head, especially in the back part thereof, and subsequently in the left temple. He was treated with wine and other stimulants. About five weeks after admission, he was found one morning in bed totally unconscious, and deprived of all power of moving the left arm and the left leg. He lay three days in a state of half-stupor and then died.

Autopsy.—The superior longitudinal, left lateral, and left petrosal sinuses were found plugged up by firm, and for the most part reddish-brown coagulum, which generally adhered pretty firmly to their walls; but in one or two places

was diffluent and broken down into a grayish-brown grumous fluid. Several veins of the pia mater, both small and large, which empty into the sinuses, contained brown adherent clots, but none of them were softened. The veins on the right cerebral hemisphere were very much engorged. The left arachnoid sac contained a considerable amount of yellowish purulent fluid mixed with soft fibrinous material. Brain-substance slightly softened at the posterio-inferior part of middle lobe of left cerebral hemisphere. An abscess about the size of a hazel-nut, existed about one-third of an inch from the surface at this spot. A large amount of turbid fluid in the lateral ventricles. The lungs showed evidences of recent pneumonia. In one or two places the pulmonary tissue had given way, accumulations of purulent matter having formed.

Von Dusch mentions an analogous case:—

The patient was a servant girl, aged 20, who was attacked with pleuro-pneumonia while suffering from typhoid fever. Contraction of the cervical muscles, convulsions of right side, and coma supervened; death ensued. The cerebral veins, superior longitudinal and lateral sinuses were found extensively obstructed with firm adherent coagula.

In both of these cases the cerebro-venous thrombosis which was developed after the occurrence of pneumonia may fairly be regarded as a result of marasmus, unless we consider the cerebral affection to be metastatic, an assumption, however, which appears much more forced.

The case of a young girl, aged 12 (already referred to), who died of a cerebro-venous thrombosis which came on at an advanced stage of typhoid fever, belongs to the same category as the above. In this case clonic and tonic convulsions, with loss of consciousness, but not of sensibility, suddenly supervened. These phenomena lasted an hour. A fresh accession soon occurred, with trembling of the muscles which lasted till death. The convulsions were followed by coma and contracted pupils. On *autopsy* the whole of the superior longitudinal sinus was found obstructed by a coagulum, everywhere adherent and partially decolourized, as also the veins of the pia mater communicating with it, etc.

Again, thrombosis of the cerebral veins may occur in connection with thrombosis of the veins of the extremities and pyæmia, as it did in the case which Dr. Janeway brought before the New York Pathological Society, April 8, 1868 (*Medical Record*, July 15, 1868).

CASE LXVIII.—The patient was a news-boy, aged 16, who entered Bellevue Hospital on the morning of April 4th, giving an imperfect history to the effect that three days before he observed on waking in the morning an "injury" to his right forearm, near the wrist, and saw a physician that day who applied splints. On entering the hospital these were removed and evaporating lotions applied. At that time he exhibited no cerebral symptoms, but in the evening he was slightly delirious, though he still walked about the ward. The next morning his condition was about the same; towards night, however, he became comatose, and so remained until death occurred at 10 P. M. the following day, April 6th. While in this state his pulse was 120 to 130, and respiration about 40.

Autopsy.—Forearm and hand œdematous. A fluctuating tumour at the wrist contained a quantity of sanious pus, that had burrowed among the tendons down to the bone; periosteum thickened and vascular, but not detached. The outer one of the radial venæ comites contained, in the middle of its course, a firm clot about two inches in length; the inner one, a whitish clot of soft consistence from commencing disintegration. The basilic and axillary veins, with the

brachial venæ comites, were distended throughout their course with soft coagulum. On the brain, chiefly on its convexity, many small opaque spots were seen in the arachnoid and pia mater, the result of thickening. Each of them was surrounded by a red border, due sometimes to congestion, sometimes to extravasation. The brain-substance showed several points of hemorrhage. *Three of its larger veins contained attached fibrinous clots*, evidently formed some time before death. In the lungs were hemorrhagic infarctions and so-called metastatic pneumonia and pleurisy. In the left ventricle were many fresh signs of ulcerative endocarditis. Numerous small white points surrounded by red areolæ, similar to those found on the arachnoid, were also found on the exterior of the heart, on the liver, in the kidneys, and small intestines. Prostate, bladder, etc., normal.

This boy's illness was of less than six days' duration. It ended fatally by coma, that is, death began at the brain. The case itself is an unusual one, and possesses three features of intense interest and great importance. They are, *firstly*, the abscess at the wrist with the accompanying thrombosis of the veins of the forearm, etc., and the pyæmic lesions of the lungs; *secondly*, the ulcerations and other changes in the left ventricle of the heart, and the multitude of white points surrounded by inflamed areolæ which were found on the surface of the brain, liver, kidneys, small intestines, and heart itself, that probably had been produced by the lodgment in the capillary arteries of these parts of minute emboli that had been washed out of the left ventricle by the blood-stream; and, *thirdly*, the obstruction of several cerebral veins of large size, with thrombus, and the occurrence of coma and death in consequence of this obstruction. It is probable that the patient would have lasted some time longer if thrombosis of the cerebral veins had not taken place. Moreover, the plugging up of these vessels was attended with the extravasation of blood at several points in the brain-substance. This case, then, serves an admirable purpose for illustrating thrombosis of the cerebral veins, thrombosis of the veins of the extremities, and capillary embolism, the result of ulcerative endocarditis.

Lastly, we have to point out that thrombosis of the cerebral veins and sinuses is an occasional consequence of *senile marasmus*. Cruveilhier (*Anat. Patholog. du Corps Humain*, liv. 36, pp. 2, 4, 5) relates two cases of this sort. One of them was that of an old woman of weak intellect, who died after twenty-four hours' coma. The superior longitudinal sinus and the veins communicating therewith were filled with a brilliant, black, adherent thrombus, and the gray substance of the cerebral hemipheres contained numerous capillary hemorrhages, etc. The other case was that of a woman, aged 80, who after having paralysis of the left half of the body, excepting the tongue and face, for some time, got paralysis of the right side, and thus died. The superior longitudinal and lateral sinuses were blocked up by thrombus, and the superior cerebral veins were also filled with plugs. In the arachnoid sac a fresh extravasation of blood was spread out over the convex surface of both hemispheres, etc.

A case related by Dr. Charcot (*Bouchard on the Pathology of Cerebral Hemorrhage*, pp. 16, 17, London, 1872) is in point. In it, however, the cerebro-venous thrombosis was due in part to senile marasmus, and in part to the depressing influence of disease.

CASE LXIX.—A female, aged 65, had pneumonia in 1858, and again in 1863. In the summer of 1865 she was under treatment for cirrhosis and ascites. On August 21st, she suddenly became paralyzed on the right side. On the 23d, at 2 A. M., she became comatose; at time of visit her breathing was stertorous, pulse small and frequent, skin warm. The limbs were all flaccid; reflex movements on both sides abolished. At 4 P. M. she died.

Autopsy.—Extensive subarachnoid hemorrhage on both cerebral hemispheres, more abundant, however, on the right than on the left one. Dark-coloured very friable clots filled up each lateral ventricle. The floor of the left one was the seat of yellow softening throughout. The left optic thalamus presented a reddish pulp on its surface, consisting of blood mixed with softened cerebral tissue. A patch of red softening was also found on the left hemisphere behind the convolution which bounds the fissure of Rolando. The gray matter had the colour of wine-lees, and the white substance beneath was softened and slightly yellowish. Another patch of red softening was found on the right hemisphere behind the fissure of Rolando, but it was smaller than the preceding. The arteries of the base were not atheromatous. On the surface of the clots which covered the inner aspect of both cerebral hemispheres two veins that emptied into the superior longitudinal sinus were seen to be stretched; they were yellowish in colour, and *contained old clots.* Liver cirrhosed; peritoneal cavity distended with yellowish serum.

The cerebral hemorrhage and cerebral softening were doubtless occasioned by thrombosis of the cerebral veins. It is also worthy of remark that cerebral or meningo-cerebral hemorrhage occurred in both of the other cases of senile thrombosis of the cerebral veins and sinuses of the dura mater mentioned above. From this circumstance we infer that when cerebro-venous thrombosis occurs in old persons, it is especially prone to occasion cerebral hemorrhage, and this relationship may be accounted for by the fact that the walls of the bloodvessels in general, usually become weakened by atheroma, fatty degeneration, etc., with advancing age.

But, in the last case, the longitudinal and other sinuses of the dura mater did not contain any coagula; and thus it is conclusively shown that thrombosis of the cerebral veins, attended with very striking morbid changes and consequences, may occur without there being any thrombosis of the corresponding sinuses of the dura mater. In Dr. Janeway's case LXVIII, also, certain of the cerebral veins were obstructed with thrombus while the sinuses remained free, and still cerebral hemorrhage was present. The reader's attention is specially called to this point, because it is a new one, and possesses considerable interest, at least for pathologists.

Etiology.—The clinical histories related above, and in the preceding paper, show pretty clearly that in one set of cases the blood coagulates in the sinuses of the dura mater as an immediate consequence of cranial injury, especially when the sinus-walls themselves are implicated, that in another set of cases the blood coagulates in these vessels as a result of various inflammatory affections of the head, internal ear, eye-socket, nose-cavity, and

face, and that in still another set of cases the cerebro-venous thrombosis is occasioned by wasting diseases or debilitating influences. Thus, we find that this disorder presents three important varieties, in respect to causation, namely, the *traumatic*, the *inflammatory*, and the *marasmic*. Some of them, however, occur much less frequently than others. For example, in looking over the 58 cases presented by Von Dusch, I find but 2 in which the origin was directly traumatic, while in 34 the causation was inflammatory, and in 22 marasmic. Besides, out of 72 additional cases collected by myself the thrombosis had a traumatic origin in only 4 instances, an inflammatory starting point in 52, and a marasmic origin in 16 patients. Finally, in a grand total of 130 cases, thus obtained, we have but 6 in which the coagulation resulted directly from traumatic causes, 86 from inflammatory lesions, and 38 from marasmic conditions, or debilitating influences. From this it appears that the inflammatory is by far the most common form of cerebro-venous thrombosis, inasmuch as it has been met with considerably more than twice as often as the marasmic, and rather more than fourteen times as often as the traumatic. Dr. Lancereaux, however, states that of 74 cases collected by himself 39 were inflammatory and 35 non-inflammatory in respect to origin; but he has doubtless overlooked many of the inflammatory cases which have rewarded my researches, and therefore his statement does not disprove the conclusion arrived at above.

1. *Causes of the Traumatic Variety.*—Concerning the formation of the coagula which are occasionally met with in the sinuses of the dura mater after injuries of the skull, Virchow has already pointed out that in some cases the coagulation probably begins in the wounded veins of the diploë as a consequence of the atmospheric air coming into contact with the blood at the gaping orifices in these vessels; for the nature of the veins of the diploë is such, and their walls are so firmly attached to the surrounding bone, that they cannot collapse, and, therefore, in cases of compound fracture of the cranium, with depression, gaping apertures may readily present themselves in the veins of the diploë through which a hemorrhagic thrombus formed externally to them may easily extend into their calibre, and thence by further prolongation may penetrate the corresponding sinus of the dura mater. In other cases, however, the formation of coagulum in the sinus is due to the fact that some foreign body, such, for example, as a fragment of the inner table of the skull, has been driven into the calibre of the sinus, and that the blood, on coming into contact with this foreign body, coagulates around it, as crystals form around foreign bodies when suspended in crystallizable liquids. This is precisely what happened in a case quoted from Schmucker by Von Dusch, wherein a splinter from the vitreous plate half an inch long penetrated the superior longitudinal sinus, and that vessel soon became plugged up with a firm

thrombus, which afterwards, to a considerable extent, underwent puriform disintegration or softening.

But thrombosis of the cerebral sinuses does not occur in all the cases wherein the part of the cranium which overlies the vessels in question is fractured in such a manner as to expose the lacerated veins of the diploë to atmospheric action, nor in all the cases wherein a foreign body is driven into the calibre of a sinus, nor in all the cases wherein the walls of a sinus happen to be wounded. On the contrary, it occurs in only a small portion of these cases, as is clearly shown by the records of clinical experience, such, for example, as M. Lassus's *Memoir on Wounds of the Superior Longitudinal Sinus* (already referred to), various of the treatises on cranial fracture, the current annals of clinical surgery, etc.

Now, why does thrombosis occur in some cases where the sinuses of the dura mater, or the parts covering them, are wounded, and not in other cases where the lesions are strictly analogous? This difference must be ascribed to an abnormal tendency on the part of the blood itself to coagulate, which is present in one set of cases, and not in the other. Indeed, it is possible that traumatic thrombosis of the cerebral sinuses never occurs unless the coagulability of the blood itself happens to be considerably increased, or the condition of the blood in respect of readiness to coagulate is analogous to that which various crystallizable solutions must possess in order for crystals to form.

If this view is correct, of which there seems to be but little if any doubt, abnormal coagulability on the part of the blood itself must be looked upon as the predisposing cause, and fractures which lay open the veins of the diploë or the walls of the sinuses, together with the curdling action of the atmosphere on the blood at the gaping apertures in these vessels, as well as the presence of foreign bodies in the calibre of the sinuses, must be considered as the exciting causes in most instances of *traumatic* cerebro-venous thrombosis. I may here remark that I am acquainted with but one or two forms of local injury which lead the blood to clot in the larger veins during life when its coagulability is not increased, and they produced by the application of ligatures, and by amputation. In such cases the blood coagulates because all motion in it has been arrested over a certain space, and the coagulum usually extends from the place of ligation as far as the nearest collateral tributary having some considerable size. This is the simplest of all the forms of thrombosis.

In like manner coagula form in certain of the veins when they have been divided, as, for example, in the operation of amputation. I remember, however, one thigh-stump in which I found on dissection that the femoral vein was occluded with blood-clot, not beginning at its cut extremity, but at the first valve above the cut extremity and extending therefrom up to the next tributary, the cut end being empty and contracted for about three-fourths of an inch. In like manner also coagula would form in the cerebral veins

and sinuses of the dura mater should the blood-stream therein be arrested by mechanical violence or traumatic agencies in any way analogous to the above. Under such circumstances it is only the portion of the blood which is completely stagnant, that coagulates, unless perchance the coagulability of the blood itself, at the same time, happens to be considerably increased.

2. *Causes of the Inflammatory variety of Cerebro-venous Thrombosis.*—A perusal of the cases belonging to this class which are related or referred to in the first part of this essay shows very clearly that some local inflammatory disorders of the head, or of the parts contained therein, much oftener give rise to thrombosis of the cerebral veins and sinuses of the dura mater than others. For example otitis interna was the starting point of this affection in 33 instances; facial anthrax, in about 30; facial erysipelas, in 3 (including 1 to be related hereafter); ozœna, in 2 (including 1 to be related hereafter); traumatic caries of the skull, in 3; traumatic inflammation of the skull and neighbouring parts without caries, in 2; suppurating wounds of the scalp, the skull being uninjured, in 1; suppurative diseases of the hairy scalp, such as chronic eczema, etc., in 2; idiopathic abscess of the eye-socket, in 3; extensive purulent infiltration following suppurative parotitis, in 1; purulent meningitis, in 4 cases, and this disorder was probably the starting point of the thrombus-formation in several other instances. Thus, it appears that although a considerable variety of inflammatory affections may produce thrombosis of the cerebral sinuses, suppurative inflammation of the ear and carbunculoid or furunculoid inflammation of the face occasion this disorder much more frequently than all the others put together, namely, in about three-fourths of all the cases. Now let us inquire more closely into the method by which internal otitis, on the one hand, and facial anthrax, on the other, bring about the formation of coagula in the sinuses of the dura mater; and, after that, ascertain, if we can, the reason why these diseases are so much more apt to be followed by cerebro-venous thrombosis than the other suppurative inflammations which so frequently attack the parts entering into the composition of the head.

With regard to suppurative otitis, it was found that in 29 out of the 33 cases above mentioned, disease of the temporal bone in the shape of caries or necrosis was the connecting link between the affection of the ear and the affection of the sinuses. It is probable that in these cases the disease of the bone caused the blood to coagulate in the minute veins of the diploë in the first instance, and that these small coagula afterwards extended themselves by prolongation until they entered and occluded the corresponding veins of the dura mater. In giving the rationale of this occurrence Von Dusch justly observes: "In thrombosis of the sinuses, the result of caries of the bones of the skull, the peculiar conditions of the veins of the diploë [that is, their uncontractible state and gaping apertures

above-described], also appear to me to play an important part. The necrosis of the individual layers of bone, resulting from the process of ulceration in the bone, must necessarily diminish the supply of blood from the bone to the large venous trunks, and it will even happen in many instances that the supply of blood from the bone to certain of these is completely arrested. But as a shrinking of the calibre of these vessels is impossible, as already remarked, the diminished or arrested supply of blood leads to stagnation, and the formation of thrombus in them, which may extend into the sinus. We should thus have to regard the thrombus in the sinuses in such cases as propagated, that in the small veins of the diploë as primary and dependent upon the comparative excess in their calibre" (*op. cit.*, pp. 100, 101).

But caries (or necrosis) of the petrous portion of the temporal bone is not always the connecting link between internal otitis and thrombosis of the cerebral sinuses, for among the cases related above are four in which internal otitis produced thrombosis of these vessels without the intervention of either caries or necrosis. In these four cases the starting-point of the clot-formation appears to have been the inflamed and suppurating part of the ear, or rather some of the venous radicles belonging to this part. One of Dr. Dickinson's cases, also related above (see Case XIV.), clearly illustrates this point. At the autopsy of this case a small vein which passed directly from the diseased tympanum into the right lateral sinus was found filled with coagulum and converted into a solid cord thereby. Thus, it appears that in this case a thrombus whose formation commenced at the suppurating tympanum extended itself along the canal of a small vein, in a direct manner from the tympanum into the corresponding lateral sinus, which in the end it completely filled, occasioning also a secondary phlebitis therein.

In a manner closely analogous to this does facial anthrax, as well as facial erysipelas, ozœna, etc., produce thrombosis of the cavernous and other sinuses. In such cases the process of coagulation commences in some minute branch or branches of the facial or frontal vein which are in relation with the suppurating parts, and travels along the facial or frontal vein and its anastomoses into the ophthalmic vein, and so on, into the cavernous sinus.

The correctness of this statement is clearly proved by the post-mortem records of the cases of facial anthrax, etc., related above. For example, the autopsy in Case XXI. revealed an abscess as large as a small nut in left part of upper lip; surrounding tissues infiltrated with matter; a branch of the facial vein extending from the abscess to the inner canthus of the left eye contained thin matter throughout; it anastomosed with the ophthalmic vein. The latter vein and the cavernous sinus were filled with a thick, chocolate-coloured liquid, containing streaks of puriform matter. The walls of these vessels were inflamed. The affection extended

through the circular sinus to the right cavernous. The autopsies in Cases XXIII., XXV., XXVI., XXXVIII., XL., and L. strongly support the same view; and the autopsy of no case supports a different view of the method by which facial anthrax and facial erysipelas produce thrombosis of the cerebral sinuses. In the account of Dr. Blachez's case of ozœna (Case XLIX.) also, it is distinctly stated that the thrombosis and secondary phlebitis were traced, at the autopsy, to the nasal ulceration as the starting point.

With regard to the other, or the remaining forms of inflammation and abscess of the head and face which have occasionally led to the occurrence of thrombosis of the cerebral veins and sinuses of the dura mater, Von Dusch aptly says: "A similar view may be taken of extensive sanious inflammations of the cellular tissue, inflammations, which, as is well known, easily lead to phlebitis of larger venous trunks and to the phenomena of pyæmia and metastatic deposits. In such phlegmonous inflammations a greater or less extent of venous radicles is, for the most part, soon destroyed by the inflammatory process, which rapidly spreads and leads to necrosis of the tissues, whereby the supply of blood to the smaller venous trunks is diminished or completely arrested, and stagnation of the blood in them takes place from the absence of the *vis à tergo*. It may, indeed, more readily occur here than in the veins of the diploë that these small vessels collapse and propel their contents into the next branch, by which means the formation of a thrombus in them would be prevented. This may also be the reason why phlebitis does not always ensue in such cases. But if the inflammatory process produces solid infiltration and thickening of the tissues around these small veins, it will happen here, as in the veins of the diploë, that, the supply of blood being diminished, the unyielding nature of the vessels will furnish conditions favourable to the formation of thrombus. These small thrombi grow, and finally reach the larger trunks, and phlebitis ensues in the latter.

The reason why this consequent [or secondary] phlebitis mostly leads to suppuration and destruction of the coats of the vein, and but seldom assumes the so-called adhesive form, lies in the deleterious nature of the thrombus, which, arising in a deposit of various products of decomposition, conveys these by imbibition into the larger vessels" (p. 101). According to this view the formation of coagula in the small veins during life must be regarded as a consequence of stagnation of the blood therein, while those in the larger veins may be represented as occasioned by propagation therefrom; and the accompanying inflammation of the vein-walls may also be looked upon as secondary. Inflammation of the outer coat of the small veins could only be assumed to be a determining cause for the formation of thrombus in so far as the infiltration or induration of the connective tissue around them might prevent the collapse of their walls.

This view is by no means a new one, and allusions to it may be found in

the very suggestive *Rational Pathology* of Henle (ii. 516, 517), who did not overlook the favourable conditions for the formation of thrombus which exist in the non-contractile veins as well as in the sinuses of the dura mater, in the veins of bone, and in veins whose coats are paralyzed, or thickened, or indurated. Henle also remarks that in cases where the blood stagnates in the capillaries from diminished *vis à tergo*, the blood may also lose its motion and coagulate in the veins which spring from these capillaries, and thus phlebitis may result from stagnation in the capillaries. In brief, the method by which various inflammatory disorders of the head and face cause the blood to coagulate in the sinuses of the dura mater and the walls of these vessels to become inflamed, is as follows: In the cases which belong to this category the process of blood-clotting usually commences in some small vein or veins connected with the seat of inflammatory change, as a consequence of blood-stasis therein, and afterwards the coagula extend themselves by prolongation until they reach and occlude the sinuses; and these consecutive thrombi generally undergo puriform softening or disintegration instead of organization, because they have their origin in the decomposing products of the primary inflammatory lesion, the more fluid portions of which are conveyed into the larger vessels by imbibition. The disintegrating thrombi act upon the sinus walls like other deleterious substances, and like foreign bodies in general, and thus cause them to become inflamed.

But the starting-point of the thrombosis was found to be either internal otitis or facial anthrax in about three-fourths of all the cases having an inflammatory origin which I have collected, as stated above. Now why are internal otitis and facial anthrax so much more liable to be followed by thrombosis and phlebitis of the cerebral sinuses than the other suppurative inflammations which attack the parts entering into the composition of the head? These are questions of great practical moment, since the indications for the preventive treatment hang thereon, and we shall endeavour to answer them as fully as we can.

Firstly, with regard to internal otitis. The first cause which we are likely to assign is increased coagulability on the part of the blood itself. No doubt this liquid is abnormally coagulable in all the cases where thrombus forms in the sinuses of the dura mater in consequence of local inflammatory processes; for it is difficult to understand why a few patients having suppurating sores on the scalp, or orbital abscess, or facial erysipelas, or ozœna should get cerebro-venous thrombosis, while the many who suffer from these affections entirely escape, unless the blood is more disposed to clot in the veins of the former than it is in those of the latter. But granting this, the question then arises why otitis interna so much more frequently causes the coagulability of the blood to be increased than the above-named affections, although they are vastly more common than otitis interna?

The last-mentioned circumstance naturally leads us to suspect that the

discrepancy is due to some peculiar features of the morbid process which are generally present in the cases of otitis interna, and are, for the most part, not present in the other cases, such as the occurrence of caries or necrosis on the one hand, and the production of a highly deleterious pus on the other. Now, although caries or necrosis of the skull was present in twenty-nine of the thirty-three cases related or referred to above, in which otitis was attended with thrombosis of the cerebral sinuses, the occurrence of the last-named disorder cannot justly be ascribed to this caries or necrosis, *per se*, because these affections of bone are very often produced in the walls of the cranium by other causes, and when they are so produced they very seldom give rise to cerebro-venous thrombosis; for example, caries or necrosis of the skull was found to be connected with thrombosis of the cerebral sinuses, in all, in thirty-six cases that are related or referred to above, but out of these the caries or necrosis was due to internal otitis in twenty-nine, and to all other causes in only seven instances, while caries or necrosis of the skull is much less frequently produced by internal otitis than by other causes, such as struma, syphilis, injury, etc. In other words, cranial caries or necrosis occurs much oftener unconnected with inflammation of the ear than it does as a result of this disease, but is, at the same time, four times more liable to be attended with thrombosis of the cerebral sinuses when produced by internal otitis than when it results from all other causes combined.

The same question then presents itself in another form, namely, why is caries or necrosis of the skull so much oftener attended with cerebro-venous thrombosis when produced by internal otitis than when produced by other causes? To this some may reply that in cases of ear-disease the caries or necrosis occurs in the pars petrosa of the temporal bone, that is, in a portion of the skull which is closely connected with the lateral sinus; but this answer is not satisfactory, because caries or necrosis is fully as often, perhaps oftener, met with in parts of the skull which bear an equally close relationship to the superior longitudinal and other sinuses of the dura mater, and that, too, without leading to the formation of thrombus in these vessels, except in occasional instances, as is already proven by statistics given above as well as by the records of clinical experience and the observations of practising surgeons in general.

We are, therefore, compelled to attribute this remarkable proclivity on the part of otitis interna to occasion thrombosis of the cerebral sinuses, not to the caries or necrosis of the temporal bone with which it is so often attended, but to something peculiarly deleterious in the purulent matter which is formed by this disease. Furthermore, it is well known to every one acquainted with the subject that, in cases of inflammation of the ear, the discharge is oftentimes dreadfully offensive. Finally, we infer that the remarkable proclivity on the part of internal otitis, above mentioned, is due to the presence of some peculiar ichor or acrid sanies in the purulent

secretion, a result perhaps of putrefactive changes, which causes the blood to coagulate first in some of the small veins connected with the seat of inflammatory change, and afterwards in the sinus of the dura mater, wherein they empty, which also permeates the thrombus by imbibition, causing it to undergo disorganization instead of organization, and the vein or sinus walls to become correspondingly inflamed. And it is highly probable that thrombosis of the cerebral sinuses was produced in the same way in some at least of the four cases of internal otitis related in the first part of this essay, wherein thrombosis of these vessels occurred without the intervention of caries or necrosis.

Again, with regard to facial anthrax. It was found, as already stated, that in about 30 of the cases having an inflammatory origin, the thrombosis of the cerebral sinuses resulted from furunculoid or carbunculoid disease (anthrax) of the face; that in every one of these cases where the veins proceeding from the anthrax were subjected to examination at the autopsy, their calibres were filled with softening thrombi and their walls were inflamed; and that the progress of the thrombosis and phlebitis was traceable through these vessels from the anthrax to the ophthalmic vein and cavernous sinus, and in occasional instances also downwards into the veins of the neck. We have likewise shown that furunculoid and carbunculoid inflammation of the face is a very fatal disease. Out of 28 cases mentioned in the first part of this essay, but 2 recovered. In 15 cases Mr. Paget saw, but 1 got well; and in a grand total of 45 cases we can find but 5 recoveries. Furthermore, we have shown that this enormous fatality is mainly due to the fact that facial anthrax excites thrombosis and secondary phlebitis in the veins connected therewith, which are rapidly propagated into the ophthalmic vein and cavernous sinus, etc., on the one hand, and into the external jugular vein, etc., on the other. Now, why does it happen that facial anthrax is so much more liable to produce thrombosis and phlebitis than any other suppurative inflammation with which we are acquainted?

Prof. Güntner holds that the short stiff connective tissue of the lips, nose, septum narium, etc., specially favours the occurrence of thrombosis in the veins belonging to these parts. This explanation, however, does not appear to me satisfactory, since suppurating wounds and ulcers of the lips and face in general, are not particularly liable, nor even apt, to be followed by thrombosis, phlebitis, and pyæmia, or either of them, which could hardly obtain if the connective tissue of these parts exerted so baleful an influence upon the veins. The truth is, this form of facial inflammation is entirely unlike any other disease known in this country. It has been called "malignant pustule," but improperly so, because it runs its course entirely without the history of contagion which belongs to that disorder. It has also been called, and with less impropriety we think, "malignant carbuncle" of the face. No doubt its peculiar malignancy is due to some

special condition of the anthrax itself, to some peculiarly acrid sanies of a septic origin and character which is developed in the foci of suppuration. We must suppose that a peculiarly intense poison is formed in these carbuncles, under circumstances that we do not exactly understand, which, on entering the veins by absorption, causes the blood in them to coagulate and to undergo putrefactive changes with great rapidity, and their walls to become destructively inflamed, in order to explain the phenomena of this disease. Moreover, this conclusion affords an important indication for the treatment of this disease.

But it may be asked whether in these rapidly fatal cases of facial anthrax the inflammation of the vein-walls does not precede the formation of coagulum in the vein-calibres—whether the phlebitis does not precede and induce the thrombosis. We reply that, on autopsy of cases belonging to this category, the vein-walls are usually found to be not at all, or but slightly, inflamed in parts where the thrombus is newest, while they are considerably inflamed only in parts where the coagulum is of a considerably older date—a circumstance which would not obtain if the thrombosis followed and depended upon the phlebitis for its production. We may, however, with propriety here remark, that a slight glance at the history of the formation of coagula in the veins during life shows that it is intimately connected with the history of phlebitis, and that widely different views concerning their origin and relationship have prevailed at different times. At first the clots were regarded as inflammatory exudations which were thrown out upon the inner surface of inflamed veins (*Hunter*). Afterwards it was ascertained that the clots were genuine coagula that had been formed from the blood itself, and then the opinion that the blood coagulated in these cases as an immediate consequence of the phlebitis, which was supported by the authority of Cruveilhier, generally prevailed. But it was reserved for Virchow, in his classical work on thrombosis, to clear up the matter and to show that, in a large majority of instances, the coagulation of blood in the veins precedes the imflammation of their walls, and that primary phlebitis with subsequent thrombosis much more rarely occurs.

3. *Causes of the Marasmic Variety of Cerebro-venous Thrombosis.*—There are four parts of the venous system in which the blood is especially liable to coagulate in consequence of debilitating influences and marasmus, during life, namely, the right chambers of the heart, the veins of the lower extremity, the veins of the true pelvis, and the sinuses of the dura mater; and of the last-mentioned, more particularly the superior longitudinal and lateral sinuses. The circumstances which specially favour the formation of coagula in these sinuses, in marasmic subjects, are the dilatations of calibre, the triangular shape, and the transverse bands (*chordæ Willisii*) projecting inwards from the walls, whereby the blood-stream is retarded, and more or less of blood-stasis (stagnation) is produced. Be-

sides, the cerebral veins, for the most part, empty into the superior longitudinal sinus in such a manner that the streams coming from them flow in directions which are either at right angles with the course of the blood in the sinus, or even oblique from behind forwards, that is, in directions more or less considerably opposed to the natural course of the blood in the sinus; and this circumstance favours the retardation of the blood-stream, not only in the sinus, but likewise in the cerebral veins themselves. Thus, we perceive that even under normal conditions the blood-current in the cerebral sinuses is comparatively slow, especially in the superior longitudinal, and the veins connected therewith; and when certain pathological conditions supervene which tend to more or less considerably diminish the force and rapidity of the general circulation, the retardation of the blood-flow, or the approach to blood-stasis, in the cerebral veins and sinuses is proportionally augmented, and a state of things correspondingly favourable to the formation of thrombus is produced. Also, we should, in this connection, again call attention to a circumstance of considerable importance which Henle was the first to point out, namely, that when the blood stagnates in the capillaries from diminished *vis à tergo*, as may readily happen in advanced cases of marasmus and debility, the blood may also lose its motion in the veins which spring from these capillaries, and thus thrombosis of these veins may result from stagnation in the capillaries, especially if, at the same time, the blood itself should be unusually disposed or inclined to coagulate.

But a perusal of the cases related above shows that other causes besides retardation of the blood-flow are concerned in the production of marasmic thrombosis of the cerebral veins and sinuses of the dura mater. And, first of all, the blood itself must be in a condition to readily coagulate, that is, it must be more coagulable than natural, or in a morbid state, whereby its coagulability is at least considerably increased. In perusing the marasmic cases of cerebro-venous thrombosis quoted above from the reports of Gerhardt, Von Dusch, West, Bouchut, Fritz, Crisp, Andrew, Murchison, Forster, Ogle, Janeway, and Charcot, I have been particularly struck by one circumstance, namely, in almost every instance the subject was obviously labouring under some blood-disorder of importance when the thrombosis occurred, and had been so affected, in most instances, for some time prior to its occurrence.

Moreover, on scrutinizing these cases we find that, although the nature of the blood-disorder differed considerably in different instances, yet all of them agreed in one particular, to wit, in exhibiting an abnormal tendency on the part of the blood to coagulate. For example, in Dr. Gerhardt's cases of diarrhœa and cholera infantum, the coagulability of the blood in the vessels became increased because its volume was rapidly diminished, and substance inspissated in consequence of the withdrawal therefrom of a great quantity of watery liquid to support the abdominal discharges. In

some cases mentioned by Von Dusch, the coagulability of the blood also became increased because its volume was suddenly diminished by excessive bloodletting, and in a somewhat analogous case related by Mr. Forster the coagulability of the blood was increased, in part, by a succession of hemorrhages to which the sloughing of a fungous tumour of the dura mater subjected the patient; in another set of these cases the increased coagulability of the blood was due to *hyperinosis*, which resulted from pneumonia in Dr. Ogle's case (No. LXVII.), from typhoid fever and pleuro-pneumonia in a case mentioned by Von Dusch, and from the puerperal state in a case also mentioned by Von Dusch; finally, in the cases of marasmus, anæmia, and debility, the result of various wasting diseases of a chronic character, such as abscess, vertebral caries, scrofulosis, lung-phthisis, chlorosis, syphilitic cachexia, albuminuria, ague cachexia, chronic pleurisy, etc., that are related by Fritz, Von Dusch, West, Bouchut, Andrew, Murchison, Ogle, Janeway, etc., the increase of coagulability of the blood was probably due to the increase of its white corpuscular element, or the state of leucocythæmia which usually attends these disorders.

This abnormal tendency on the part of the blood to coagulate is doubtless one of the most important of the agencies which are concerned in producing the marasmic variety of cerebro-venous thrombosis. There is, however, another cause which is almost always concerned in producing this disorder, that possesses nearly equal importance. It is the enfeebled action of the heart, or the diminished force of the circulation which is usually present in the cases belonging to this category as an immediate consequence of the anæmia, debility, and marasmus. There results from this weakening of the cardiac contractions a corresponding tendency on the part of the blood to stagnate in the capillaries and to cease to move in the veins beyond them from want of the *vis à tergo*. This point in the etiology of this affection is also important because the vigour of the heart's contractions can be increased by remedies.

Another cause which probably exerts some influence, in occasional instances, in producing the marasmic variety of cerebro-venous thrombosis, is vaso-motor paralysis of the cerebral bloodvessels, which, by destroying the contractility of these vessels, would allow them to become expanded by the force of the blood-stream, and would favour in a corresponding degree the occurrence of stasis and coagulation, especially in the capillaries and veins.

Again, age exerts an important influence in producing the marasmic variety of this affection. Its victims are mostly found among the very young and the aged. Infants and young children are especially liable to be attacked by it because they are exposed to the occurrence, not only of the diseases which produce it in the more advanced periods of life, but also of special diseases, such as the colliquative diarrhœa and cholera infantum, which, as we have shown above, may rapidly increase the coagu-

lability of the circulating blood by diminishing its volume or inspissating it, on the one hand, and, at the same time, may induce it to stagnate in favourable localities by weakening the cardiac contractions and diminishing the vascular tension, on the other. Furthermore, during infancy and childhood the brain constitutes a much larger proportional part of the whole body, amounting then to one-tenth or one-fifteenth thereof, than it does in adult years, when it becomes reduced (comparatively) to one-fortieth or one-fiftieth part of the whole body. Besides, the watery brains of infants are especially prone to shrink and thus cause the cerebral veins and sinuses to expand their calibres in order to fill up the resulting vacuum, on the occurrence of any disease which rapidly withdraws the serum from the blood and compels it in turn to withdraw the serum from the substance of the brain, as well as from the parenchyma of other organs, by the process of absorption. Aged people, also, are especially liable to be attacked by cerebro-venous thrombosis, because the coagulability of their blood is prone to become increased from senile marasmus, while the cardiac contractions grow weaker from the decay incident to advancing years, and the cerebral veins and sinuses become expanded and the blood-stream sluggish in them in consequence of the shrinkage to which their brains are exposed from senile atrophy. Moreover, in aged people the force of the blood-stream is apt to be weakened in the capillaries, veins, and sinuses of the brain, by the occurrence of atheroma and fatty degeneration in the coats of the cerebral arteries, which renders them more or less stiff, non-elastic, and non-contractile, and thus still further lessens the *vis à tergo* of the senile heart. But, although marasmic thrombosis of the cerebral veins and sinuses of the dura mater is most frequently met with in aged persons and young children, it may also occur at any other period of life when some disease is present which induces a cachectic state of the system with feeble heart-action, and, at the same time, increases the coagulability of the blood.

Furthermore, we should remark that the causation of cerebro-venous thrombosis is usually a very complex affair, and that not a solitary one but several of the factors above mentioned are jointly concerned in the production of almost every individual case. We should also state in this place that we have discussed the etiology of this deadly disease as thoroughly as we could, with a hope that we might discover in this way what the causal indications are for its treatment, and thus acquire some means to prevent its occurrence and to obviate its mortality. These indications, however, will be taken up and duly considered in the appropriate place, that is, under the head of treatment.

Anatomical Appearances or Changes.—On examining post-mortem the veins and sinuses affected with thrombosis they usually present externally a more or less swollen or distended appearance, and are more or less stained with a reddish or a brownish hue. On opening them the distension

is found to be due to the thrombus which fills up the calibre and dyes the walls with its colouring-matter. The thrombus itself, if recent, is usually dark-red or brown in colour, pretty firm in consistence, rather dry, somewhat elastic, laminated, and more or less strongly attached to the vessel which contains it. As it grows older, however, the red corpuscles gradually disappear, and at the end of ten days or a fortnight it may be so completely decolourized as to resemble a plug of pure fibrin. But in the cases of inflammatory origin it almost always undergoes softening or disintegration, and sometimes putrefaction. In such cases, also, the walls of the affected veins and sinuses are exceedingly apt to be inflamed. When the thrombus softens the disintegrating process usually commences at its centre, and the liquefied material varies in colour and consistence from that of wine-lees to that of cream-like pus. More frequently, however, it has a dirty reddish-brown appearance, and the consistence of purulent matter. Examined with the microscope the disintegrating thrombus, even when puriform in appearance, is found to consist of granular fibrin, oil-drops, some red corpuscles more or less altered or broken down, and many leucocytes. When the walls of the affected veins and sinuses are inflamed they become thickened and more or less softened, their capillary vessels injected, their inner surface tomentose, roughened, and sometimes eroded or ulcerated, as well as dark-red in colour. When erosions or ulcerations are present, genuine purulent matter can also be found intermingled with the disintegrating thrombus. Furthermore, the veins which lie on the distal side of the thrombosed sinus are generally gorged with blood, the pia mater and cerebral substance œdematous, with more or less serous effusion in the ventricles, and in many instances blood also is extravasated into the meninges or into the cerebral substance.

In *nineteen* of the cases related or referred to above, cerebral or meningo-cerebral hemorrhage occurred. This complication, however, is met with very much oftener in the marasmic than any other variety. Of these nineteen hemorrhagic cases sixteen had a marasmic origin, and an examination of them shows that cerebral hemorrhage is most liable to occur in cases where the superior longitudinal or straight sinuses, or the cerebral veins themselves, are thrombosed. But secondary phlebitis is met with very much oftener in cases having an inflammatory than in those having a marasmic origin. Besides, in these cases the inflammatory process is exceedingly apt to spread from the sinus-walls to the contiguous membranes of the brain, thereby inducing a meningitis which is often purulent in character; and sometimes the inflammatory process spreads also to the brain-substance and induces inflammatory softening and abscess therein. Finally, the cases having an inflammatory origin are frequently, and the marasmic cases occasionally, complicated with the occurrence of hemorrhagic infarctions in the lungs, of so-called metastatic pneumonia and

pleurisy, of so-called secondary abscesses in the lungs, liver, etc., and with the phenomena of pyæmia or septicæmia.

Symptoms and Course.—Different observers give somewhat different views of the phenomena produced by thrombosis of the cerebral veins and sinuses of the dura mater. We shall, however, present only a brief sketch of the symptoms which the leading varieties of this disease present, and illustrate it with condensed reports of some additional cases. Dr. Hubner (*Archives . . Heilkunde*, ix. 5, p. 417, 1868) gives the following instance of marasmic thrombosis of the cerebral sinuses, wherein, as usually obtains, the diagnosis was not made during life, together with a critical analysis and interpretation of the symptoms:—

CASE LXX.—The patient presented at first general head-symptoms, but soon afterwards neuralgia of the right supra-orbital nerve, blepharoptosis on the same side, œdema of the corresponding eyelids, loss of hearing, and finally facial paralysis on the right side with blood-stases in the corresponding frontal veins. These phenomena were all very transient. On *autopsy* there were found thrombosis of the superior longitudinal and transverse sinuses, thrombosis of the right cavernous sinus, and thrombosis of the right ophthalmic vein.

Dr. Hubner thinks the formation of the thrombus in this case commenced in the superior longitudinal sinus and extended therefrom into the transverse sinuses; the obstruction of these vessels with coagulum brought on an intense collateral stasis of blood in all the sinuses at the base of the brain. The stasis thus produced in the cavernous sinus led to dilatation of the collateral veins of the face, and to compression of certain nerves, including the great sympathetic; hence to dilatation of the cerebral arteries. When the thrombosis had extended as far as the cavernous sinus, the phenomena of stasis and compression diminished in intensity. It is easy in this way to explain the mutability of the symptoms, which was indicated by Lebert as one of the characteristic phenomena of thrombosis involving the cerebral sinuses.

Dr. Hubner remarks concerning the phenomena which result from thrombosis of the cerebral sinuses: The stasis in the cerebral veins generally gives rise to characteristic cerebral symptoms. Venous dilatation may also exist in the collateral vessels of the walls of the cranium, or rather it may show itself in the veins which unite the vessels of the face to those of the cranium. In the latter case vascular dilatation has considerable diagnostic importance. In obstructions of the transverse sinuses one may observe dilatation of the emissary veins of Santorini and of the mastoid vein. The parietal veins also are dilated in cases where the longitudinal or ethmoidal sinuses are obstructed. When the ophthalmic vein which carries to the cavernous sinus the blood of the frontal vein, of the ophthalmic bulb, of the eyelids, and of the ocular muscles, is obstructed with thrombus, one may observe a venous injection in the skin of the forehead, with œdema of the eyelids, of the globe of the eye, and even of the ocular muscles; hence doubtless arises the prominence of the eye often noticed in cases of this kind (*Archiv. Gén. de Méd.*, 1869, vol. i. pp. 357–359).

Dr. Hermann Weber (*Medico-Chirug. Transact.*, vol. xliii. pp. 177–180) relates the following case in which erysipelas of right side of face, etc., was followed by thrombosis of right ophthalmic vein and of right cavernous and circular sinuses, meningitis, and death. The account of the symptoms and *post-mortem* appearances, although much abridged, is very interesting and useful in this connection :—

CASE LXXI.—F. M., aged 25, a pale and delicate-looking shoemaker, was attacked by erysipelas of right cheek and right eye on December 14th. At the end of a week the erysipelas had almost disappeared, and the patient was considered convalescent, when, on December 23d, he began to complain of dull headache; pulse 105; body temperature increased. During the next three days the headache increased, there was occasional delirium, grinding of teeth in sleep, twitching of muscles; pupils rather contracted, almost immovable; sickness and constipation with a pulse slow and irregular (60–85). On December 27th, he became drowsy; pupils wide and sluggish; left arm slightly paralyzed. On December 30th, drowsiness much increased; pupils dilated and insensible; paralysis of left side extending now to leg as well as arm. The degree of this paralysis varied at different times, but a remarkable, although transient improvement of this symptom and all the others occurred on December 31st, when the drowsiness almost disappeared, the patient became conscious, and was able to speak to his friends; in the following night, however, the coma returned, the pulse became very weak and frequent, the breathing irregular, until death ensued on January 2d.

Autopsy 26 hours after death.—Upper part of nose, lids of right eye, and surrounding tissue slightly swollen; a moist light-brown scab from an almost dried blister is seen on right side of nose; a similar scab on upper lid of right eye, slight œdema of pia mater on both sides; purulent meningitis on lower surface of anterior lobe of right hemisphere; lateral ventricles contain about two ounces of turbid fluid; their walls slightly softened, but the rest of the brain-substance normal. The right cavernous sinus feels hard and enlarged; its walls are thickened and its calibre filled by a grayish-red coagulum strongly adherent to the lining membrane, which appears not quite smooth. The clot is composed of several layers; the exterior being grayish-red, the middle purer red, the centre cherry-red, and softer than the others. The internal carotid and the nerves in the walls of the sinus appear unchanged. The ophthalmic vein, in connection with the sinus, contained a dark coagulum, rather firmly adherent to the thickened lining membrane, but the rest of this vein, as well as the veins of the face, etc., were not examined, because it was not permitted to open the orbit and the tissues of the cheek. Blood in circular sinus coagulated; that in left cavernous sinus not quite coagulated; their walls normal; the other sinuses exhibited nothing pathological. Heart hypertrophied; lungs and abdominal organs normal; no secondary abscesses.

The brain-symptoms in the above case resemble in many respects those caused by acute hydrocephalus, which was, in fact, diagnosed by two physicians who examined the patient without being acquainted with his history. The changing character of the hemiplegia was remarkable, and not less so the striking improvement of all the symptoms two days before death; but the latter phenomenon has occasionally been seen to occur in the most deceptive manner in other diseases of the brain (*Weber*).

The fact that the appearance of head-symptoms was preceded by erysipelas of the face, especially of the right eyelids and side of the nose, that the right ophthalmic vein and right cavernous sinus were distended with thrombus and their walls inflamed, and that there was circumscribed purulent meningitis confined to the under surface of the anterior lobe of the

right cerebral hemisphere, renders it pretty certain that the endocranial affection was caused by the facial erysipelas, and that the ophthalmic vein was the medium of communication. It is not improbable that the coagulation of the blood commenced in the capillaries and venous plexus of the right side of nose, cheek, and eyelids, and proceeded thence to the right ophthalmic vein and cavernous sinus, as it did in Cases L. and LI., related in a previous paper, which are strictly analogous to the above.

The inflammatory thickening that was found in the coats of the ophthalmic vein and cavernous sinus might lead to the view that phlebitis (properly so called) was the first link in the chain of pathological processes, and that the coagulation of the blood and the alteration of the clot in these vessels were only the consequences of inflammation of their walls. As we know, however, that the presence of blood-clot in veins, and the changes in composition which it is very liable to undergo, are in themselves sufficient to cause inflammation of the vein-walls, on the one hand, and that inflammation of the vein-walls alone is not sufficient to cause thrombosis on the other, the inflammatory thickening above mentioned cannot be considered to possess any value as evidence that the erysipelatous process was propagated from the face to the membranes of the brain by idiopathic phlebitis, instead of thrombosis and secondary phlebitis.

Dr. Hermann Weber (*Medico-Chirurg. Transact.*, vol. xliii. pp. 182–186) has also reported the following case of cerebro-venous thrombosis resulting from syphilitic ozœna, in which the symptoms of thrombosis were complicated with those of pyæmia. The following brief account of it will likewise prove useful in this connection :—

CASE LXXII.—A waiter, aged 24, of scrofulous parentage, had been afflicted with constitutional syphilis for about six years, and with syphilitic ozœna for over one year.

February 4. He has headache, especially in frontal region ; rather increased by shaking the head ; not increased by tapping on the forehead. Nose flattened and slightly swollen ; nostrils blocked up by dry brownish crusts ; fetor moderate ; pressure on nose not painful ; pupils symmetrical and responding well to light ; pulse regular, about ninety ; bowels costive.

7th. Appearances of nose unchanged ; headache constant, but increased at night ; yesterday he was often delirious ; to-day he is drowsy, but can be roused, and then answers reasonably ; pupils rather dilated and sluggish. Has had repeated rigors. Spleen yesterday found perceptibly enlarged ; to-day there is in addition, tenderness of lower part of left side, and a soft friction-sound is occasionally heard.

9th. Somnolency increased ; carphology ; muttering delirium ; muscular twitching, especially in thighs ; ptosis of left upper eyelid ; motions of left eye much restricted from paralysis of external rectus ; pupils (both) wide and sluggish ; tongue dry ; pulse 120–125, very small ; friction-sound over lower part of left chest again noticed ; dulness increased.

10th. Complete coma ; right-sided hemiplegia ; left eye almost closed ; its conjunctiva slightly injected. Death on the 11th.

Autopsy 22 hours after death.—Examination of eye-socket not allowed. Circumscribed purulent meningitis limited to the inferior surface of anterior lobe of left cerebral hemisphere ; veins of pia mater distended and filled with dark coagula. Lateral ventricles contain about three drachms of not quite transparent fluid.

Superior longitudinal sinus contains a dark-red coagulum, rather firmly adherent to its walls, which, however, are not perceptibly altered. Left cavernous sinus filled by a crumbling slightly cohesive thrombus of reddish-gray colour. The external part thereof adheres closely to the walls. The central part is softened to the consistence of thick pus, and has a brownish-red colour. The walls of this sinus are considerably thickened, as are also those of the ophthalmic vein (as far as examined) which is likewise filled by a dry, rather dark coagulum. The internal carotid artery and the nerves in relation with the left cavernous sinus appear not materially changed, excepting increased thickness of the surrounding areolar tissue. The left inferior petrosal, the circular, and the right cavernous sinuses contain a dark-red coagulum, which adheres but slightly to the unchanged lining membrane. The other sinuses of the dura mater contain a loose coagulum which does not adhere at all. Cranial bones not carious.

The softenened part of the thrombus of left cavernous sinus, examined with the microscope, contains: 1st. Small granules, which are dissolved by acetic acid; 2d. Aggregations of such granules into irregular-shaped bodies (round, oval, crescentic), which are likewise dissolved by acetic acid, nowhere exhibiting the characters of pus globules; 3d. Other granules and aggregations of granules, dissolvable by ether and not by acetic acid; 4th. Oil-globules of various size; 5th. Blood-globules of different shapes, some being much shrunk, some exhibiting a tendency to the star form, others being granular on the surface.

A pint of purulent effusion in left pleural cavity; secondary abscesses in lungs and liver. Spleen enlarged and much softened.

The dropping of the upper lid of left eye, as well as the paralysis of the left external rectus, in this case, are easily accounted for by considering the relation which existed between the third and sixth nerves and the thrombosed cavernous sinus, together with the thickened state of the surrounding connective tissue, since these nerves may have been compressed thereby.

The symptoms referable to the cerebro-venous thrombosis were frontal headache, delirium, stupor, dilatation of pupils, swelling of left eyelids, injection of conjunctiva, ptosis of left upper eyelid, paralysis of left external rectus oculi, right-sided hemiplegia, and coma. The symptoms referable to pyæmia were rigors occurring at irregular intervals, marked increase of body-heat, enlargement of spleen, soft friction sound and dulness over lower part of left chest, muttering carphology and other muscular twitchings, dryness of tongue, and great frequency of pulse. With regard to the diagnosis, an attentive consideration of the history of the patient, and of his symptoms as a whole, employing at the same time the process of exclusion in their interpretation, could hardly fail to lead any one familiar with the subject of thrombosis of the cerebral sinuses, together with the symptoms of pulmonary infarction and pyæmia, to a correct understanding of the case.

The thrombosis probably commenced in the veins directly connected with the nasal ulceration, and proceeded thence by prolongation through the anastomosing branches of the facial vein into the left ophthalmic, and the left cavernous sinus. The thickening of the walls of these vessels was the result of inflammatory action excited therein by the presence of a disintegrating thrombus; and the purulent meningitis in turn was due to the

extension of the inflammatory process from the walls of the ophthalmic vein and cavernous sinus to the neighbouring membranes of the brain. The thrombosis of certain veins of the pia mater, which was found on autopsy, resulted in all probablity from the purulent meningitis, and the formation of thrombus in the superior longitudinal sinus was occasioned by the extension of the thrombi from the cerebral veins to the calibre of the sinus.

But a review of the various cases of thrombosis of the cerebral veins and sinuses of the dura mater, heretofore presented, conclusively shows that the symptoms attending this affection when produced by inflammatory causes differ considerably from those which are present when it results from debilitating or marasmic influences. Without descending too much into particulars we may remark that in the cases of inflammatory origin we are much more apt to find phlebitis of the sinuses together with an inflammation of the membranes of the brain which has been lighted up by an extension of the inflammatory process from the sinus-walls to the contiguous membranes of the brain, on the one hand, as well as the phenomena of pulmonary infarction and septicæmia, on the other, than in the cases having a marasmic origin. In fact, the marasmic variety of cerebro-venous thrombosis is but seldom attended with secondary phlebitis, septicæmia, and the so-called metastatic pneumonia, while the inflammatory variety is often attended with these consequences. In the marasmic cases, then, we but seldom or never find the symptoms complicated with, or masked by, the phenomena of secondary meningitis, of septicæmia, or metastatic pneumonia.

What are the consequences, so far as the brain is concerned, of plugging up the cerebral veins and sinuses of the dura mater with coagulum? They are the following: venous congestion, œdematous infiltration of the pia mater, and of the brain-substances itself, together with cerebral hemorrhage in a large proportion of the cases. In other words, the substance of the brain becomes compressed by the engorged veins, the exuded serum, and the extravasated blood; or, speaking more correctly, the cerebral capillaries become compressed in this way, and the nerve-filaments and ganglion-cells of the cerebral substance deprived of nutrient blood. The symptoms resulting from thrombosis of the cerebral sinuses are, therefore, the symptoms of cerebral anæmia, namely, sopor with or without convulsions, pain, paralysis, coma, death. It will be observed that the symptoms are much the same as when the anæmia of the brain-substance is produced by some other cause.

The question then arises whether it is possible to make a differential diagnosis between cerebral anæmia due to thrombosis of the cerebral sinuses and that due to other causes. Von Dusch thinks that when infants are the subjects such a diagnosis can sometimes be made. He points out that in such cases as those related by Dr. Gerhardt the symptoms taken to-

gether indicate with tolerable certainty the presence of cerebro-venous thrombosis. When profuse diarrhœas in weakly children are followed by the above-mentioned cerebral symptoms, with depression of the fontanelles and overlapping of the cranial bones, accompanied by an unequal distension of the two external jugular veins, the diagnosis of cerebro-venous thrombosis is highly probable, the disease being located on the side where the vein is least distended; but the absence of the last-named phenomenon does not exclude the possibility of thrombosis of the cerebral sinuses, because if the superior longitudinal sinus alone, or both lateral sinuses simultaneously, happen to be the seat of the disease, no inequality with respect to distension can be observed in the two external jugular veins. In most of the marasmic cases, however, the diagnosis is very uncertain and can only be based on a general consideration of all the symptoms, or be arrived at by the exclusion of other affections.

In the cases which have an inflammatory origin the symptoms that present themselves are usually due not so much to cerebral anæmia as to certain morbid changes in the membranes and substance of the brain, and to septicæmia with pulmonary infarctions or so-called metastatic pneumonia. When, however, in cases of chronic otitis, or facial furuncle, or facial erysipelas the above-mentioned symptoms of cerebral anæmia supervene, and cannot otherwise be accounted for, they should lead us to strongly suspect that thrombosis has occurred in the sinus of the dura mater which lies next to the inflamed part; and in cases of facial anthrax and of facial erysipelas this diagnosis will be still more probable if there are also œdematous tumefaction with incomplete closure of the eyelids and protrusion of the eyeball on the affected side of the head.[1]

The mutability or transient character of the symptoms which obtains in many cases belonging to each variety of this affection is probably due to the fact that the degree of cerebral anæmia is not constant but varies according to the growth of the thrombi themselves, as well as in accordance with the freedom with which the blood escapes from the brain through the collateral channels.

Ophthalmoscopic Symptoms of Cerebro-venous Thrombosis.—But few observations on this point have been placed on record. Dr. Bouchut, however, (*L'Union Médicale*, 1869) concludes, from his own experience with the ophthalmoscope in cases of cerebral disease, which appears to have been extensive, that hyperæmia of the retinal veins, when attended with stasis and the formation of coagulum, denotes repletion of the sinuses and thrombosis of the meningeal veins; that œdema of the papilla indicates thrombosis of the sinuses or of the cerebral veins; and generally

[1] In facial anthrax such symptoms as the following, namely, headache, delirium, stupor, dilatation of the pupil, difficulty in swallowing, incontinence of urine, and coma, pretty uniformly occur.

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that in cases where the cerebral circulation is greatly disturbed (as it is in cerebro-venous thrombosis) one may see something analogous in the eye (*Brit. and For. Med. Chirurg. Review*, Oct. 1871, pp. 511, 512). Should these opinions be confirmed by other observers, they will furnish diagnostic signs of great importance.

Treatment.—In this disease art is powerless to dissolve the thrombus or to reopen in any other way the obstructed veins and sinuses of the brain, after the coagulum is formed. In treating this affection, therefore, the physician should mainly direct his attention to the prophylaxis; that is, while treating the various accidents and disorders which, as shown above, are liable to prove fatal by inducing cerebro-venous thrombosis, he should endeavour to prevent the formation of the thrombus itself, and in doing this he must be guided by the causal indications. We will briefly present them for each variety of the disease.

1. With regard to the traumatic variety: the indications for treatment which are derived from a consideration of the etiology of this variety are few and simple. They consist in the removal by surgical means of any foreign bodies which penetrate the sinuses so as to come directly into contact with the blood contained in them, or press upon them externally, so as to narrow their calibre, or obstruct the movement of the blood through them in any other way. They consist also in rendering nugatory the operation of any cause which by increasing the coagulability of the blood promotes the formation of thrombus at the seat of injury, in avoiding excessive bloodletting, in arresting excessive hemorrhages, and in restraining excessive alvine discharges in cases of cranial injury.

2. With regard to the inflammatory variety: inasmuch as the occurrence of thrombosis and phlebitis in the cases belonging to this variety is due to the presence of some deleterious agent of peculiar character, some special ichor, in the inflamed part or suppurating focus, as we have shown above, which by virtue of its own destructive properties causes the blood to coagulate in the veins proceeding from the inflamed part, and in the corresponding sinus of the dura mater, which likewise causes the thrombus itself to disintegrate, and sometimes to putrefy, and the walls of the affected vessels to become inflamed, the causal indications for the treatment of these cases are also very plain. They consist in preventing the development of this poison in the inflamed or suppurating part on the one hand, and in reducing it to a state of inertness, that is, in destroying it, on the other.

Experience has shown that internal otitis, facial anthrax, facial erysipelas, and eczema, but especially the first two, are the inflammatory disorders which are most liable to be attended with thrombosis of the cerebral sinuses. In cases of suppurative otitis we can do much to ward off thrombosis by securing a free outlet for the matter, by extracting the fragments of dead bone as soon as they become detached, and by the persistent use of antiseptic or disinfectant washes, such as chlorine water, liquor sodii chlorinat. suitably

diluted, weak solutions of carbolic acid, pretty strong solutions of sulphite of soda, etc., and the "girondin" disinfectant fluid. An aural surgeon of eminence informs me that the last-named has yielded very satisfactory results in his hands. By employing these means we may keep the purulent matter in the internal ear and neighbouring parts from putrefying, and the ichor above mentioned from forming, or we may destroy it if already formed.

Generally, while treating the local inflammatory affections of the head we can best diminish the risk of cerebro-venous thrombosis by the early evacuation of all purulent collections with free incisions, by cleanliness, and by the unstinted use of antiseptic fomentations and lotions, combined with appropriate internal medication. But when carbunculoid or furunculoid inflammation (anthrax) of the face presents itself, something more is required in order to prevent the development of thrombosis, phlebitis, and septicæmia. The terrible mortality recorded against it above (40 deaths in 45 cases) shows the insufficiency of the plans of treatment heretofore employed. The medication must be more radical and thorough in order to prove successful. The pimple, boil, or pustule which ushers in the disease, that is, the inflammatory focus, wherein the special septic poison which induces the thrombosis, etc., is formed, must be destroyed with an unsparing hand, at an early stage, if we would save the patient. The plan of treatment which has proved so successful in a strictly analogous disease, the malignant pustule of Europe, should be tried in this affection also. Dr. Belles (*Gaz. Méd. de Paris*), a physician practising in the districts of Béja and Faro, in Portugal, where malignant pustule is very frequent in consequence of the number of cattle raised there, says he has treated hundreds of cases of this disease without having noted a single death. The treatment employed by Dr. Belles consists in crucial incision of the boil throughout its whole extent, in depth as well as breadth, and cauterization with chloride of antimony, repeated until bleeding ceases. The gangrenous tissue is completely insensible to both cutting and cauterization (*Med. Record*, Aug. 1873, p. 372). The separation of the eschar should be favoured by the application of antiseptic poultices made of charcoal, yeast, bark, etc., or, better still, by antiseptic fomentations, consisting of carbolic acid (part 1 to 200), or liquor sodii chlorinat. (part 1 to 12), or zinci chlorid. (part 1 to 200), or of the "girondin" disinfectant fluid. Prof. Güntner, of Salzburg, who saved two out of five cases of facial anthrax, recommends especially the constant application of warm fomentations. He found that cold applications were positively hurtful. Mr. Thomas Smith (*Clin. Soc. Transact.*, iii. p. 63) also proposes that the sulphite of soda or magnesia should be systematically administered from the very first in facial anthrax as a preventive of blood-poisoning. At the same time, if the body-temperature ranges high, it may be advantageously abated by giving quinine in full doses, or in such doses as to produce cinchonism.

3. With regard to the marasmic variety: in the cases belonging to this

sort of cerebro-venous thrombosis, also, the causal indications for treatment are but few and plain. In managing the various forms of chronic disease which are attended with marasmus, leucocythæmia, and great debility, and which, as we have shown above, are also liable to result in thrombosis of the cerebral veins and sinuses of the dura mater, the indications are first to lessen the abnormal tendency on the part of the blood itself to coagulate, and second, to prevent the occurrence of blood-stasis in the venous system by supporting the failing powers of the heart and arteries. And here we should remark, that the physician's success in saving or prolonging life in cases of pulmonary tuberculosis, chronic bronchitis, chronic pneumonia, chronic pleurisy, chronic abscess, vertebral caries, chlorosis, leukæmia, scrofulous adenitis, ague cachexia, syphilitic cachexia, infantile marasmus, senile marasmus, and many other debilitating diseases, will largely depend upon his ability to prevent the occurrence of thrombosis in some part of the venous system. Moreover, it is a fortunate circumstance that the remedies which are best adapted to fulfil the above-mentioned indications are, for the most part, also the medicines which experience has shown to be most useful, in a general way, in combating these several diseases. These remedies are the various preparations of ammonia, especially the muriate and carbonate, alcoholic stimulants, quinine, and such cardiac excitants as digitalis and atropia.

After much observation and reflection, I have no doubt that certain preparations of ammonia, especially the muriate, carbonate, aromatic spirit, and the liquor ammonii anisatus of the Prussian codex, are capable of diminishing considerably the coagulability of the blood when it is morbidly augmented, and that too, without inducing debility even when their use is long continued. For this and other reasons I hold the muriate of ammonia to be one of the most valuable medicines with which I am acquainted. It is probable that the spt. ammon. aromat and the liquor ammon. anisat. prove so useful in the bowel complaints of children, when great debility is present, not only because they strengthen the cardiac contractions, but also because they diminish the coagulability of the blood itself. It is doubtless for a similar reason, that the administration of carbonate of ammonia proves so serviceable in scarlatina, that it is held by many to be almost a specific for that disease. Finally, it was the aromatic spt. of ammonia taken steadily for many months which saved the patient in the only case of leukæmia that I have found recorded where recovery took place.

53 SOUTH WASHINGTON SQUARE, Feb. 1st, 1874.

ART. VI.—*On the Value of High Powers in the Diagnosis of Blood Stains.* By JOSEPH G. RICHARDSON, M.D., Lecturer on Pathological Anatomy in the University of Pennsylvania, and Microscopist to the Pennsylvania Hospital. (Read before the Biological and Microscopical Section of the Academy of Natural Sciences, and recommended for publication in the American Journal of the Medical Sciences.)

IN the pages of this Journal for July, 1869, appeared an article on the detection, by the microscope, of red and white corpuscles in blood stains, in which I advocated the employment of high powers in such examination, and asserted that by their aid I had been able to demonstrate that the residuum of a dried blood-clot, left after the action of pure water, so long mistaken by Virchow, Robin, and their followers, for "pure fibrin," was composed chiefly of the *cell walls* of the red blood corpuscles, and that by proper management these *capsules* of the red disks could be brought clearly enough into view to enable me to measure them accurately, and so distinguish the dried blood of man from that of an ox, pig, or sheep, with a certainty disputed by Caspar, Wyman, Fleming, and other previous observers.

This possibility of recognizing blood globules when dried *en masse*, is of course closely associated with, if not actually dependent upon, their possession of a cell wall, as maintained in my paper on the cellular structure of the red blood corpuscle, in the *Trans. of the Am. Med. Assoc.* for 1870 (the theory being mainly deduced from experiments upon the gigantic blood disks of the Menobranchus, in which crystals of hæmato-crystallin were seen to prop out a visible membranous capsule). Indeed, as I have elsewhere remarked, if the red blood globules are simply homogeneous lumps of jelly-like matter, the chance of discovering any individual corpuscles in a mass of dry blood clot, however moistened, seems almost as hopeless as the search after individual rain drops in a cake of melting ice.

Notwithstanding this, however, we find, in the third edition of Prof. A. S. Taylor's work on Medical Jurisprudence (vol. i. page 548), figures of red blood corpuscles of ten different animals, as they appear under a low power, with the statement (strictly accurate in regard to blood disks thus *feebly* magnified), that "there are no certain methods of distinguishing, microscopically or chemically, the blood of a human being from that of an animal, when it has been once dried on an article of clothing." This declaration seems to show that more complete and conclusive proof is still needed of the superior advantage derivable from the application of high objectives to the diagnosis of blood stains.

The *à priori* arguments against the value of this microscopic test for distinguishing human blood from that of the ox, pig, horse, sheep, and goat, may be grouped under three heads, viz.: 1st. It is objected, as by

Taylor, Caspar, and others, that the difference between the red blood corpuscles of man and of these domestic animals, is too minute to render their positive discrimination possible, and too insignificant to admit of its being used as the means of condemning a fellow creature to death. 2d. That even if the average diameters of these various corpuscles were shown to be so different that we might sometimes by this means distinguish them, yet the variations above and below the mean diameter are so frequent and irregular, that they must render the determination of any such averages by mere micrometric measurement unreliable; and 3d, many investigators believe, with Virchow and Brücke, that no microscopist can "hold himself justified in putting in question a man's life on the uncertain calculation of a blood corpuscle's ratio of contraction by drying."

In reply to the first of these objections, it may be urged, that the blood corpuscles are just as much characteristics of the different kinds of living beings in which they occur, as are the coverings of the body, the shape of the legs, or the number of joints in the antennæ, so that, exactly as we may tell, for example, a bird's skin from an animal's, by the former being covered with feathers, whilst the latter is furnished with hair, so we may distinguish a bird's or a camel's blood from that of a man, by the former having oval corpuscles, whilst those of the latter are rounded in their outline.

Further, in regard to the red blood disks of animals with rounded corpuscles, I can perhaps best illustrate the principles that guide us in their discrimination by suggesting that these bodies may be aptly compared to different sizes of shot. Thus, for instance, the red globules of man's blood are nearly twice the size of the sheep's, and about four times that of the musk deer's, just as No. 1 shot is perhaps double the magnitude of No. 5 and quadruple that of No. 8.

It is obvious, too, that a shot dealer in the latter case, or a skilful microscopist in the former, would more quickly and surely *distinguish* two analogous sizes of red blood, or of leaden *globules*, from each other, than could an inexperienced apprentice in either occupation.

Hence it follows, that whilst we might be in doubt whether the shot dissected out of the body of a wounded man was a No. 1 or a No. 2, we could have no hesitation, after measuring it with a gauge, in declaring it was too large for a No. 5, and *a fortiori* for a No. 8, precisely as the corpuscles of man's blood might be confounded with those of a monkey's, but on measurement are seen at once to be too large for those of an ox or sheep. Nor can it be disputed that *mere measurement* in either instance, when practically correct, is quite sufficient to decide a doubtful case, as, for example, if I was to shoot myself in the hand, and then assert that it had been done by some one else, whose gun was known to be loaded with No. 8 shot, whilst the grains in my flesh were actually of the size of No. 1.

It must be remembered, too, that whilst the relative differences between corpuscles of human, ox, and sheep's blood remain the same, the absolute difference becomes more perceptible in proportion as the disks are magnified above, for example, those represented in Dr. Taylor's work, so that when the former corpuscles appear $\frac{2}{3}$ of an inch and the latter $\frac{2}{3}$ of an inch across (as they do under the $\frac{1}{4}\frac{1}{0}$), they can hardly be mistaken for another, any more than a 12-inch shell could be mistaken for a 6-inch shell, even by a careless person, who would call a No. 1 a No. 5 shot.

Ordinarily in criminal cases the microscopist is called upon to determine, not whether a particular specimen is human, as distinguished from all other kinds of blood, but to discriminate simply between the blood corpuscles of a man and an ox, a man and a horse, or a man and a sheep, and so establish or disprove the defendant's story as to how his clothing or other articles became stained with blood. Sometimes the much easier task is imposed (as in a recent case wherein I was engaged) of diagnosing between the blood of a human being and that of a bird (trial of Charles Larribee for the murder of Lewis Williams, at Franklin, Venango Co., Pa., see *Oil City Daily Derrick*, May 1st, 1874). In this instance many of the suspected stains occurred on the prisoner's boots, and proved upon that article of clothing singularly easy of detection.

Finally, I would remind those, who demur at the idea of allowing a man's life to hang upon such seemingly insignificant circumstances as a difference in size of blood corpuscles, how often the reactions of arsenic, afforded by a quantity of the metal too excessively trivial to be accurately estimated by the most delicate balance, have sufficed to bring out the crime of murder, and to aid in securing that just punishment for violation of law in which we all have so deep an interest, because on it all our enjoyment of life and property depends.

To the second objection, viz., that the variations above and below the standard size of corpuscles, from any particular animal, are too great and irregular to permit us to obtain an accurate result by measurement, I would answer, that this difference in size is more especially observable in corpuscles dried in a thin film upon a glass slide, and is then probably in part a pathological change due to external violence in spreading and drying. These variations are comparatively slight in fresh blood, as is proved by the following experiments, made with my $\frac{1}{5}\frac{1}{0}$th inch objective, which gives with the micrometer eye-piece an amplification of 3700 diameters. When thus magnified the human red blood disks appear about one inch and one-eighth in diameter, so that even slight differences in their size can be accurately measured. Among one hundred red corpuscles freshly drawn from five different persons, the maximum, minimum, and mean diameters were as follows :—

		Max.	Min.	Means.
Twenty from a white male aged	30	1-3231	1-3500	1-3355
" " " " " "	38	1-3281	1-3529	1-3375
" " " " female "	44	1-3249	1-3500	1-3381
" " " African " "	50	1-3182	1-3559	1-3384
" " " white male "	8	1-3231	1-3500	1-3398
Average of means				1-3378

The measurement of twenty corpuscles from part of the first of these specimens dried in a thin film upon a slide gave a maximum of $\frac{1}{3500}$, a minimum of $\frac{1}{3231}$, and a mean diameter of $\frac{1}{3378}$ of an inch.

Moreover, if it can be shown that the smallest red discs of man, as usually met with in mechanically unaltered blood, whether dry or moist, are larger than the largest corpuscles of an ox, and *a fortiori* of a sheep, such an objection, as regards these particular animals at least, becomes valueless, and that this is the case I propose to presently demonstrate.

As illustrating the accuracy which some practical experience in measuring minute objects, like the red blood disks, with the cobweb micrometer enables us to attain, I may instance the following fact, which my friend, Prof. Theodore G. Wormley, M.D., of Columbus, Ohio, kindly permits me to mention here, but which may appear more in detail in his appendix on blood stains to the next edition of his splendid work on *Micro-Chemistry of Poisons*. During a recent visit to Philadelphia Prof. Wormley brought with him a slide of human blood, upon which were seven corpuscles (designated by numbers on an accompanying drawing), which he had measured under several different objectives and forms of apparatus. These corpuscles Dr. W. requested me to measure under my $\frac{1}{25}$ immersion lens, and after doing so, I found that my results agreed very closely with his own, and that in two or three instances they were precisely identical. The mean diameter of the seven disks, according to my computation, was $\frac{1}{3378}$ against $\frac{1}{3378}$ of an inch, the average of his measurements. There was thus a total deviation from the true size of only $\frac{1}{3378}$ of an inch in my results, which were those of an independent observer, seeing the objects for the first time, and determining their magnitude under a magnifying power, and by the aid of apparatus entirely different from those Prof. Wormley had employed.

Thirdly, the assertion of Virchow, that a man's life should not be put in question on the uncertain calculation of a blood corpuscle's ratio of contraction by drying, does not seem to me a fair statement of the point at issue; because since the red blood corpuscles of oxen, horses, pigs, sheep, deer, and goats are all much smaller than those of man, no degree of *contraction* which they could undergo would render the stains in which they occur *more* liable to be mistaken for man's blood; and if, as is rarely, if ever, the case, human red blood corpuscles in a stain were by any means contracted so as to resemble those of an ox, for instance, in size, the evi-

dence from microscopic examination would only mislead us into assisting in the acquittal of a criminal, and could not betray us into aiding to convict an innocent person.

Had Prof. Virchow worded his statement so as to read, "the uncertain calculation of a blood corpuscle's ratio of contraction *or expansion* by drying," his objection would have been strictly logical, although, as I believe, it would not have been founded upon fact, because if a corpuscle of ox blood could *expand* during the process of desiccation or of moistening so as to even approximate to the human red disk in magnitude, it might mislead us into testifying erroneously to the presence of man's blood, when beef blood alone had been shed, and thereby endangering the life of an individual who was entirely guiltless.

But my observations, made upon many different kinds of blood, and under a great variety of conditions, clearly indicate that the cell wall of a red blood globule is nearly or quite inelastic, and incapable of any marked expansion by the process of drying or moistening with the fluids I recommend for the examination of blood stains. The slight increase of size mentioned above as occurring in the desiccation of a thin film of blood, forms, I believe, only an apparent exception, and is probably due to a change of shape taking place during the complete flattening out of the disks as they lose their contained water. The experience of Prof. Leidy and Prof. Wormley accords with mine, in that they have never seen the drying or remoistening of red blood corpuscles cause them to expand, and I therefore conclude we may affirm that when the corpuscles remain uncontracted, their indications are perfectly reliable, and if they shrink (as I believe they rarely do), that being the only serious modification which they can undergo, the sole danger is that by a possible, but not probable, mistake in diagnosis of the origin of a blood stain through contraction of its corpuscles, we might contribute to a criminal's escape, *never* to the punishment of an innocent party.

But all these theoretical considerations are of very secondary importance in comparison with the positive fact, as to whether practically we can or cannot discriminate the stains of human blood from those made by the blood of oxen and sheep. I have, therefore, endeavoured to *work out* a conclusive answer to this question, obtaining it by a method which will, I trust, carry conviction to the mind of every honest seeker after truth.

On the 16th of May, 1874, my friends, Prof. J. J. Reese and Dr. S. Weir Mitchell, each kindly prepared for me three packages of dried blood from stains made by sprinkling the fresh fluid from an ox, a man, and a sheep, upon white paper. The two series were simply numbered 1, 2, and 3, and a memorandum preserved by each gentleman, specifying which kind of blood composed each sample. By this plan it is obvious that I was prevented from having any clue to the origin of the specimens save that

afforded by the microscope, and my examinations and measurements were, therefore, entirely free from bias.

Some small particles from specimen No. 1, handed me by Prof. Reese, were broken up into a fine dust, with a sharp knife upon a slide, and covered with a film of thin glass. A few drops of the ordinary three-quarter of one per cent. common salt solution were then successively introduced at one margin of the cover, and removed from the opposite edge, as they penetrated thither, by a little slip of blotting-paper, thus washing away the colouring matter from the tiny masses of dried clot. When these particles were nearly decolourized, a drop of aniline solution was allowed to flow in beneath the cover, and, after remaining about half a minute, was in its turn washed away, and its place supplied by a further portion of weak salt solution.

On adjusting the specimen as thus prepared, under a $\frac{1}{25}$ immersion lens (giving an amplification with the A. eye piece, of 1250 diameters), a fragment of the blood stain was soon discovered, which displayed the delicate cell walls of its component red and white corpuscles, as figured in my *Handbook of Medical Microscopy*, p. 284. Ten consecutive red disks from these, selected simply as among those which had become but little distorted, were found to measure as noted below in the first column. The second and third rows of figures show the result of similar experiments, performed on samples 2 and 3, all the magnitudes being given in parts of an English inch.

Specimen No. 1.	Specimen No. 2.	Specimen No. 3.
1-3448	1-4762	1-5555
1-3572 (minimum)	1-4762	1-6060
1-3572	1-4878 (minimum)	1-5405 (maximum)
1-3572	1-4651	1-5880
1-3333	1-4878	1-6666 (minimum)
1-3125 (maximum)	1-4444 (maximum)	1-6060
1-3448	1-4444	1-5777
1-3278	1-4762	1-5555
1-3333	1-4651	1-5888
1-3448	1-4762	1-5777
1-3407 (mean)	1-4694 (mean)	1-5828 (mean)

Since the red corpuscles of human, ox, and sheep's blood measure, according to Gulliver, $\frac{1}{3200}$, $\frac{1}{3267}$, and $\frac{1}{5300}$ of an inch respectively, and previous experiments of my own had demonstrated a disposition to *slight* contraction in the corpuscles of blood stains which have been dried and moistened again, I of course concluded that sample No. 1 was human blood, No. 2 was ox blood, and No. 3 was sheep's blood. On reporting these diagnoses to Prof. Reese, I had the satisfaction of learning that they were "entirely correct."

Careful examination of the three specimens furnished me by Dr. Mitchell, and prepared in a manner similar to that detailed above (except that

diluted liq. iodinii comp. was used instead of aniline liquid for tinting the cellular elements), led me to analogous conclusions, as will be seen from the following table of measurements :—

Specimen No. 1.	Specimen No. 2.	Specimen No. 3.
1-4545	1-6250	1-3572
1-4762	1-6250	1-3390
1-4878 (minimum)	1-6060	1-3175 (maximum)
1-4347 (maximum)	1-6450 (minimum)	1-3278
1-4444	1-5880	1-3448
1-4762	1-5777	1-3333
1-4651	1-5555	1-3572
1-4878	1-5405 (maximum)	1-3390
1-4545	1-6250	1-3572 (minimum)
1-4878	1-5880	1-3636
1-4662 (mean)	1-5952 (mean)	1-3430 (mean)

From these results, I of course decided that No. 1 was ox blood, No. 2 was sheep's blood, and No. 3 was human blood, and on reporting my conclusions to Dr. Mitchell, I was again very much gratified to receive a reply informing me that they were perfectly correct.

It is interesting and important to observe, that in no instance do the minimum diameters of the human blood corpuscles closely approach the maximum diameter of even those from ox blood. It is true that corpuscles are occasionally to be met with both in fresh blood and in dried clot, which fall much below the general average of the specimen, but these are comparatively rare (not amounting to over one in a hundred), and they so generally in fresh blood bear such marks of traumatic injury or pathological change, that it is only fair to disregard them in making up our estimates. If my views are correct respecting the osmotic processes constantly going on through the cell wall of both the red and the white corpuscles (*vide* Report on the Structure of the White Blood Corpuscle, *Trans. of Am. Med. Assoc.*, 1872, p. 178), alterations in the specific gravity of the liquor sanguinis, surrounding the corpuscles, produced by desiccation at the margin of the thin glass cover, must cause slight changes in the diameter of the disks. Nevertheless, as these variations necessarily lie between their normal size ($\frac{1}{3375}$?), and their magnitude when dried upon a slide ($\frac{1}{3175}$?), they can never lead to confusion in diagnosis even from ox blood.

In regard to the practical minutiæ of the examination of blood stains, I have little to add to the description given a page or two back, except concerning the menstrua advised by various authors.

The saturated solution of sulphate of soda recommended by Prof. Charles Robin, and endorsed by numerous authorities, has the disadvantage of rapidly crystallizing around the specimen, and must, I think, owe its popularity chiefly to the fact that it often contains large quantities of a peculiar

fungus, the spores of which closely resemble red blood corpuscles both in size and general appearance, and have, I doubt not, frequently been mistaken for blood cells. Diluted albumen and solution of hypophosphite of soda have not in my hands seemed to possess any peculiar advantages, and the method of Erpenbeck, quoted by Prof. Taylor, of gently breathing on the fragments of blood clot until they are sufficiently moistened to liquefy, will not, I believe, in general enable us to demonstrate any corpuscles except the leucocytes of the coagulum. These leucocytes have probably often been mistaken by observers for "decolourized red disks."

The highly refractive properties of glycerin and its solutions advised by Dr. Taylor and others, render it in my judgment less applicable as a liquid for moistening blood stains and bringing into view the delicate cell walls of their constituent corpuscles than the 75 per cent. salt solution. I can, however, fully agree with my friend, Dr. R. M. Bertolet, that for preservation and prolonged study of specimens of blood stains, glycerin forms the best medium at our disposal, although it seems to me that his suggestion, that we should before mounting them tint the cell walls and nuclei of oviparous blood corpuscles with the reagents employed in the admirable guaiacum test for blood, will be found in practice less advantageous than my own plan of using aniline solution. And this in part on account of the difficulty of procuring the ethereal proportion of peroxide of hydrogen, and of applying it to microscopic specimens, and partly because it will prove so much harder to convince the average juryman that a bright blue material (instead of a crimson-red substance) is actually clotted blood.

In examining spots of blood more than one-tenth of an inch in diameter, I would advise that fragments should be scraped from the edges or thinnest parts of the stain, because specimens from the central portions sometimes exhibit numerous fibrin filaments, which have appeared before the desiccation of the drop. These of course interfere with the investigation, by forming a more or less complete meshwork around the cell walls, and so confusing the delicate outlines which the latter present when the view is uninterrupted.

As a contribution towards answering the question of how long after their deposit upon objects blood stains may be detected by microscopic investigation, I may mention that a fragment from one of the twenty blood spots used in May 1869, "for estimating the delicacy of the microscopic test for blood" (determined at $\frac{1}{13000}$ of a grain, as stated in my paper in vol. 58, N. S., of this Journal, p. 57) was recently examined as above described, and found still at the end of *five years* to exhibit multitudes of corpuscles, which could be clearly distinguished from those of the ox or sheep, as will be seen by the following record of measurements made May 23, 1874:—

1-3572	of an	inch.	
1-3448	"	"	
1-3278	"	"	
1-3125	"	"	maximum.
1-3390	"	"	
1-3509	"	"	
1-3448	"	"	
1-3509	"	"	
1-3572	"	"	minimum.
1-3448	"	"	
1-3425	"	"	mean of ten corpuscles.

The corresponding average of my measurements five years ago was $\frac{1}{3474}$ of an inch, so that no further contraction seems to result from age, and as the outlines of the corpuscles appear quite as distinct now as they did soon after the blood was drawn, it seems probable that this microscopic evidence of human bloodshed will be equally unmistakable twenty or even fifty years hence, provided due care continues to be exercised in its preservation from moisture and external violence.

In conclusion, I submit, that the results of my experiments above narrated *prove, that*, since the red blood globules of the pig ($\frac{1}{4230}$), the ox ($\frac{1}{4287}$), the red deer ($\frac{1}{4334}$), the cat ($\frac{1}{4404}$), the horse ($\frac{1}{4600}$), the sheep ($\frac{1}{5300}$), and the goat ($\frac{1}{5368}$ of an inch), are all so much smaller than even the ordinary minimum size of the human red disk, as measured in my investigations, *we are now able, by the aid of high powers of the microscope*, and under favourable circumstances, to positively distinguish stains produced by human blood from those caused by the blood of any of the animals just enumerated, and this even after the lapse of five years from the date of their primary production.

No. 1620 CHESTNUT STREET, PHILADELPHIA.

ART. VII.—*On Transfusion of Blood, with a Report of Eight Cases, and a Description of a Convenient Apparatus for Performing the Mediate Method.* By THOMAS G. MORTON, M.D., one of the Attending Surgeons of the Pennsylvania Hospital; Emeritus Surgeon to Wills (Ophthalmic) Hospital, Philadelphia. (With three wood-cuts.)

TRANSFUSION of blood may be so readily performed, and with such entire safety, that it is somewhat surprising that this recognized life-saving operation has not been resorted to more frequently.

Transfusion seems especially indicated where death is imminent from hemorrhage; while in the slow convalescence after fevers, in anæmia, and in diseases accompanied by excessive drain, or in cases of blood poisoning,

this operation, by introducing a vigorous healthy element directly into the circulation, would seem particularly applicable.

In transfusion the surgeon has the choice between the immediate and the mediate methods; in the former arterial or venous blood is conducted direct from an artery or a vein in the donor into a vein of the receiver. In the mediate method the blood of the donor is defibrinated, strained, and then injected.

I am not aware that the immediate operation has ever been performed in this city, while the transfusion of defibrinated blood has been very successfully done a number of times.

In the immediate method small clots of blood it is supposed are liable to form in the connecting rubber tubing between the donor and the receiver, and these if injected would doubtless produce serious results; venous blood is also generally transfused, since arteriotomy is seldom if ever recommended.

Immediate transfusion from the radial artery, as has been suggested, would answer admirably for the receiver, but donors of blood, although they might be willing to submit to venesection, would hardly allow the opening of a main artery.

Having used defibrinated blood now in four cases with such perfectly satisfactory results, I see no reason to relinquish this plan in favour of the immediate method.

1st. There is no danger from the formation of clots, or from the introduction of air.

2d. The donor's blood, which is venous when drawn, is partially oxygenized by its exposure during defibrination.

3d. The amount injected is readily measured.

4th. The avoidance of all haste in the operation.

5th. Drawing the blood and its defibrination need not be conducted before the patient.

Dr. J. G. Allen has furnished me with a report of his four operations, with a note respecting my first case at the Pennsylvania Hospital, one of impending dissolution from hemorrhage, when I had Dr. Allen's assistance, who had twice successfully performed transfusion.

The apparatus we then used was not altogether satisfactory; it was simply a tin receiver, in which the blood was collected and defibrinated, a syringe and canula attached.

Mr. Kolbé afterwards made, at my suggestion, a more compact set of instruments, consisting of a receiver which was suggested by Dr. Allen, and so arranged that the blood is constantly surrounded by warm water, to this was added a thermometer; a glass syringe, and blunt canulas, lancets, and an extra thermometer complete the case.

Description of Instruments.—The receiver is a cylindrical vessel, made of German silver, six inches in diameter, and six inches in height, having

at its upper and outer edge a short half-inch metal tube, closed by a screw cap through which water is introduced into the water-tight chamber; on the outside is a thermometer, the curved bulb of which lies in the chamber, and by which the temperature of the water is regulated. In the interior is an inverted cone gilded on the exposed surface, into which the blood is drawn; this cone is joined to the outer vessel at the top; a broad lip is attached to the upper part of the receiver, extending about one-third of the way around. (See Figs. 1, 2.)

Fig. 1.

Fig. 2.

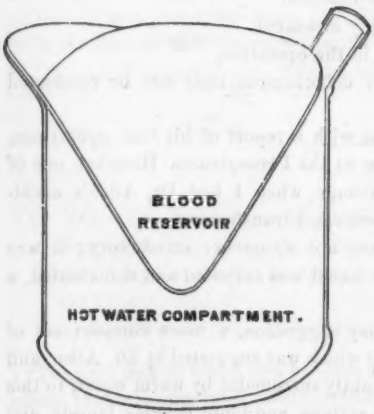
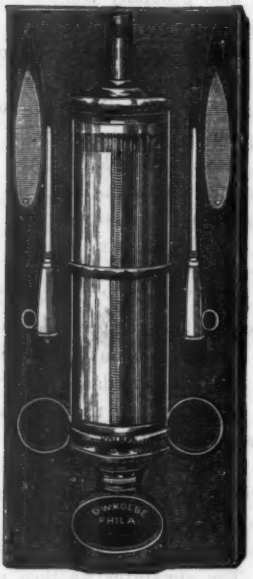


Fig. 3.



The syringe is of glass, five inches long by one inch in width, metal bound with hard rubber at each end, holding two ounces, with a tapering rubber nozzle one and a half inches in length. The canulas are blunt steel tubes, two inches long and one-twentieth of an inch in diameter, to which

is attached a conical metal neck, into which the tapering extremity of the syringe accurately fits. (See Fig. 3.) An ordinary thumb lancet or two completes the case. Besides these instruments a tumbler or bowl, surrounded by hot water at the time of operation, to receive the blood while it is being strained, and some fine linen will be required. Two or three whisks, six inches long by an inch thick, should be at hand, simply tied together in the middle so that both ends may be made available; these are quickly made from a common clothes whisk or broom.

Method of Defibrination.—The hot water compartment (Fig. 2) is filled through the tube with water at a temperature of from 110° to 112°, which can be regulated by the thermometer. The blood drawn from the donor is collected in the receiver and constantly kept stirred with a whisk, upon which the fibrin quickly collects. Should one whisk become choked another may be substituted. The blood, when defibrinated, is then strained through some fine clean linen into a tumbler or bowl surrounded by water at the temperature before indicated. While the straining is progressing, which occupies a minute or two, the receiver is carefully washed out, and the strained blood poured back and is now ready for injection.

Operation.—Either the median cephalic or the median basilic vein, or in young subjects the saphena just above the ankle, should be exposed and opened by an incision on a line with the vessel; a blunt canula is then inserted and held in place by the finger of an assistant; should the distal end of the vein bleed, it is readily controlled either by pressure or an acupressure pin. The syringe is immersed for a moment in hot water, and then *not quite* filled with the defibrinated blood; the nozzle is then placed in the canula, and the piston being then drawn out to its full extent, any particles of air which may have been in the canula or tube are sucked out, and with a slight elevation of the syringe, pass through the contents of the syringe to the top

The blood is then slowly and steadily thrown into the patient, and the operation repeated until the desired amount has been injected. During transfusion, except in one instance, I have not observed any marked change either in respiration or the circulation. In the case alluded to, at the close of the operation the patient, who was at the time unconscious, showed an oppressed state of breathing, which looked serious, but soon vanished on opening the windows. Dr. Allen thought at the time this might have been due to the entrance of some bubbles of air.

The largest amount of blood which I have transfused was eleven ounces, the smallest quantity two ounces; in this case the small amount injected was found quite sufficient to stimulate the heart to active contraction, when all the symptoms indicated that life was on the verge of extinction.

In this instance, a child of eleven years of age, I had very great difficulty in finding the vein in the arm, the vessels being exceedingly small, and quite collapsed, so that a somewhat tedious dissection was necessary.

Defibrination is objected to on the ground that a large quantity of the red globules are unavoidably removed with the fibrin; this I am inclined to

believe is not so much as supposed, for I have found the fibrin collect at the end of the whisk with apparently very few of the globules.

I do not apprehend, nor have I known of any trouble arising from opening a vein, which has been suggested, and to avoid this the use of the sharp aspirator like needle has been recommended

I tried in two of my transfusions thus to introduce the sharp needle, wishing to avoid exposing the vein, but had to abandon the attempt in both instances; the vessels were collapsed, and the injection could not be made to pass, as the needle point invariably and unavoidably punctured the opposite wall of the vein.

It has also been stated as an argument in favour of immediate transfusion that clots are not liable to form in the connecting tube, that "as the fluid is drawn into a vacuum, there is no danger of coagula forming."[1] While "coagulation is accelerated by exposure to air, it is not prevented by complete exclusion from it, as is proved by its taking place in a vacuum,"[2] and any one who has ever used the artificial leech may have observed, that coagula form almost at once in the exhausting syringe, which is essentially in vacuo.

The question of loss of time in performing the various steps incident to defibrination has also been urged against the mediate method; but I believe that the defibrinating process may be completed almost if not quite as quickly as any apparatus for the immediate transfusion can be arranged.

CASE I. *Lacerated wound of face and upper jaw; hemorrhagic diathesis; continued hemorrhage; ligation of the common carotid artery; transfusion; death from rupture of jugular vein.*—On the 15th of October, 1869, W. P., aged 27, was admitted into the Pennsylvania Hospital on account of continued hemorrhage from a severe laceration of the upper lip and jaw. Eight days before admission he fell down stairs while carrying a pitcher; a fragment of the broken china penetrated deeply the inner surface of the upper lip a little to the left of the median line, producing a very deep irregular ugly wound. When admitted he was exceedingly weak from the loss of blood; his mouth was full of clots which were washed out, and plugs of lint saturated with the persulphate of iron inserted; hemorrhage again took place two hours afterwards, which was only stopped by the direct application of a compress and roller placed on each side of the nose. At 5 P. M. hemorrhage again occurred, and a long accupressure needle was passed entirely through the upper lip and a silk ligature thrown tightly over it. Till the morning of the 19th no more hemorrhage took place. It then recurred, and both facials were compressed by needles upon the lower jaw, which, however, did not check the flow of blood. 7 P. M. After consultation with Dr. Wm. Hunt, ligation of the external carotid was decided upon; but, finding this impracticable, the ligature was placed on the main vessel, the patient being nearly exsanguine and totally unconscious. Slight oozing from the wound continued.

20th. The patient, although not having lost much since the operation,

[1] New York Med. Record, March 30, 1874. Rowe on Transfusion.

[2] Carpenter's Phys., Am. ed., p. 210.

was in a comatose condition and appeared to be dying. With Dr. Allen's assistance and direction, transfusion was performed by the mediate method at 4 P. M., assisted by Dr. Hunt, and Dr. Hunter the resident physician, in the presence of a number of medical gentlemen; Drs. W. C. Cox and Haines, then students of medicine, gave the desired amount of blood. Eleven ounces of defibrinated blood were transfused; a marked rigor followed the operation. In two hours afterwards the patient was semi-conscious.

21*st*. The lips had a better colour, and he was perfectly rational and able to sit up in bed, and without any further hemorrhage.

26*th*. He was walking about the ward and was presented to the medical class. He continued to improve till November 3d, when the internal jugular vein gave way, causing death on the 5th of the same month. The operation of transfusion prolonged the life of the patient over two weeks.

CASE II. *Suspected carcinoma of the stomach; marked leucocythemic symptoms with great prostration; transfusion; relief; death four months afterwards from cancer.*—I was consulted in August, 1870, by Mr. C. K., a German gentleman, aged 45, who had been suffering for a long time with gastric derangement, his symptoms having gradually assumed a rather severe character with marked jaundice and dysenteric symptoms. The patient had an excellent physique, with formerly a fine florid complexion, of late a sallow waxy hue; his weight was usually 180 pounds, but during the preceding month or two he had lost considerably; food was rather disgusting to him, and what little he took produced much discomfort; scarcely a day passed without one or more attacks of vomiting; a considerable quantity of disorganized blood was frequently mixed with the matter ejected. He had been a very free liver; used to late suppers, and had for years drank to excess. A careful examination failed to detect any abdominal tenderness or tumour, and an analysis of the urine was made by Dr. J. G. Richardson, disclosing no renal trouble. The patient was placed upon the "milk cure" for three weeks; this was followed by a very carefully regulated diet with nutritious injections. A trip to the mountains was also very beneficial, and produced marked improvement. At the close of September the old symptoms, vomiting and distress, returned, and day after day he gradually became weaker and was soon confined to bed. Champagne and beef-tea were prescribed, and the nutritious enemata were given every four hours with good results. The bloodless appearance of the patient and the absence of any abdominal tumour, with slight tendency to œdema of the hands and feet, gave rise to the idea that possibly the affection might be simply leucocythemia; the skin, mucous membrane of the mouth, and gums presented an absolutely blanched appearance; in fact, the patient looked as if he did not possess a globule of red blood; although able to retain a considerable part of the nourishment taken, yet no portion of it seemed to be assimilated, and from the excessive prostration, death seemed inevitable at an early period. Drs. J. F. Meigs and Mitchell saw the patient on several occasions in consultation. In November, death appearing imminent, transfusion was suggested to the patient, and the operation immediately agreed upon; for should the disease be cancer, life would likely be prolonged, and if his disease should prove simply an inability of the digestive organs to assimilate, a favourable change might be induced by transfusion. Accordingly the operation was performed as previously described, November 12, 1870, with the assistance of Drs. Mitchell, Hunt, Brinton, and others. The donor of the blood was a nephew of the patient, a stout, vigorous

young man; rather more than six ounces of defibrinated blood were injected into the median basilic vein of the left arm. The syringe was filled three times, and no unpleasant symptom was observed, either in the respiration or circulation, during or after the operation.

The gums and lips of the patient, which had an absolutely blanched appearance, quickly assumed a decided tint which gradually deepened. A comfortable night was passed, and on the following day there was a marked change for the better; his strength and spirits revived, and a very decided improvement in all respects was observed.

The nutritious enemata were continued, with champagne and broths by mouth.

Two months after the transfusion his health began to fail rapidly, with constant sick stomach, great and rapid emaciation, and death occurred March 23, 1871. At the post-mortem examination very extensive carcinomatous ulceration was found to involve the *upper* surface of the stomach, and especially the cardiac extremity; the pylorus was free from the disease.

In this case the transfusion gave temporarily a new lease of life; for the patient could not have long survived the terribly prostrated condition he was in at the time of the operation.

I attempted here to introduce the sharp needle without exposing the vein, but found it impossible, from the collapsed state of the vessel.

CASE III. *Hæmorrhœa petechialis; repeated epistaxis, associated with alveolar hemorrhage; almost fatal prostration; transfusion twice performed at intervals of six weeks, with recovery.*—Ida H., aged 11, a slender girl, in apparently good health, was suddenly seized, September, 1871, with copious bleeding from the left nostril and bladder; at the same time her entire body presented the characteristic petechia purpura, minute spots appearing over the entire body, with large ecchymoses on the limbs an inch to an inch and a half in diameter.

The child was so much reduced by the loss of blood that for nine months she was confined to her bed, and during this period scarcely a day passed without some bleeding; gradually she regained her strength. In September, 1872, she had a severe recurrence of the hemorrhage which nearly proved fatal; the nasal bleeding was controlled by injections of persulphate of iron and plugging the nose. As in the first attack, the body was entirely covered with ecchymotic spots; the extravasations of blood on the front of the legs were of enormous size. On Feb. 2, 1874, the third attack was ushered in by hæmorrhœa petechialis followed by continued nasal hemorrhage; the child was drenched with blood and exceedingly prostrated; the use of alum water with plugging the nostrils controlled the flow, and under iron, champagne, beef-tea, and punch improvement followed. February 8, the spots appeared again and hemorrhage occurred, and before relief could be obtained, the bleeding was so profuse that the child was almost exsanguine; the blood found its way back as well as front, and had been vomited in large quantities; no pulse could be felt at the wrists, and her extremities were cold, and death seemed imminent. Large blue patches of effused blood appeared under the skin especially on the limbs, and her entire body was covered with the smaller purpuric spots.

Transfusion was proposed and immediately agreed upon, and performed with the aid of Dr. Wm. C. Cox, at 12.30 P. M.; the uncle of the child gave the blood, which was defibrinated. The median cephalic vein in the left arm of the child was opened after much difficulty, on account of the very small size and collapsed condition of the vessel, which could not be

found until after considerable dissection. A blunt canula was then introduced and two ounces of blood were injected; no unpleasant symptom was experienced by the patient during the procedure; the pulse, which was imperceptible prior to the transfusion, could now be counted; a comfortable night was passed; pulse 136.

February 12. A slight appearance of blood from the nose, but stopped without treatment; pulse 94; temp. 98°. Beef-tea and champagne were continued.

13*th*. Patient up, and doing well.

14*th*. The child was out driving, and was very comfortable and quite strong, with digestive organs in good condition. She continued apparently well until the afternoon of the 29th of March, when hemorrhage came on from the gum of the lower jaw, where one of the first teeth had fallen out. Towards evening the ecchymosed patches and purpuric spots again announced a serious condition, and severe nasal hemorrhage occurred. I did not see the child until 11 P. M., and then found her almost bloodless and without pulse, bathed in cold perspiration, and in a dying state. With Dr. Cox's assistance I again performed transfusion; the aunt of the child, a stout lady of 35 years of age, was the donor of the blood; defibrination, as previously described, was effected in a very few moments. Having so much difficulty with the vein in the arm previously, I selected the saphena vein of the right leg just above the ankle, which was laid bare, and a pin passed under its distal end and compressed by a silk ligature. Six ounces were satisfactorily injected, and with immediate good effect. Two grains of quinia with stimulants and opiates were administered, five grains of protocarb. iron were ordered three times a day; some milk-punch, beef-tea, etc., and at the end of a week the emulsion of cod-liver oil with lactophosphate of lime was added.

April 7. Doing well, up, going about as usual, excellent pulse, no appearance of having lately suffered the loss of so much blood.

May 26*th*. Is in perfect health.

The rapid improvement and recovery following each transfusion, presents a marked contrast with the tardy convalescence, with confinement to bed during nine months, which followed the first hemorrhage, in 1871; while the transfusion, which was performed twice in this patient, is rendered more interesting from the fact of the subject being so young.

The following notes of cases have been obligingly communicated to me by Dr. J. G. ALLEN.

CASE I. Was that of a patient of Dr. Wm. Carroll, December 30, 1868; a Mrs. P., residing in Dock Street. She was suffering from hydræmia consequent upon long-continued and repeated uterine hemorrhages in connection with a stubborn though mild type of intermittent malarial fever. She had not improved in the least under long-continued previous tonic treatment, which had been carefully carried out, in connection with some local treatment of the uterus, which was patulous and spongy, the os being studded over with a few pale granulations. She was scarcely able to move in her bed from weakness, at the time of the operation. At least six ounces (6 oz.) of defibrinated blood were injected. The patient soon after rallied and regained a very satisfactory degree of health. About eighteen months afterward she became pregnant and aborted at fourth or fifth month. Meanwhile had ceased to employ Dr. Carroll and fell into the hands of a very unskilful practitioner, and died from hemorrhage connected with this miscarriage.

CASE II. Occurred in a member of the medical profession, suffering from purpura hemorrhagica; he was about twenty-six years of age, and I believe of

phthisical inheritance, and had a marked so-called scrofulous diathesis. In early life had suffered from repeated abscess and ulceration of the neck involving the cervical glands; had been frequently the victim of obstinate epistaxis.

For a few days previous to the operation he had been bleeding from the posterior nares, to stop which all efforts were unavailing. After a time the blood began to ooze freely and rather rapidly from the gums and almost all portions of the mucous surface of the mouth. The blood seemed wholly disorganized, and the patient was in the most deplorable condition, literally at death's door. About seven or eight ounces of defibrinated blood were injected, and in six or eight hours after the operation the blood which had been oozing from the patient's mouth and nose began to coagulate, and finally ceased to flow. No one had expected the man to live twelve hours at the time of the operation, the immediate effect of which was undoubtedly beneficial, as the patient revived and lived I think more than a month afterward; the hemorrhages, however, recurred, and the patient finally succumbed to the continued losses of blood and inherited vice of constitution.

Dr. Carroll assisted at the first operation, and Dr. Hoehling of the Navy assisted me at both, and has reported the cases.[1] Dr. H. errs, however, as to the quantity of blood injected. I have since measured the syringe used, and found it to hold more than we at the time estimated. The case first reported I believe to be the first successful instance of transfusion in America and the first attempt by Mader's method.

CASE III. Was a patient of your own in the wards of the Pennsylvania Hospital I allude to the case of wound of the upper lip from falling upon a fragment of broken pitcher which the patient was carrying.

One point I desire specially to call your attention to in this case: the patient, as you know, was extremely prostrated at the time of the operation; he was upon a low and inconvenient hospital bed, and we were excessively crowded by a great number of medical gentlemen and students who witnessed the operation. You will remember we accidentally passed into his vein two or three little bubbles of air not larger than a pea, a kind of froth which had collected upon the blood in the syringe, this was, after the operation, followed by, and the probable cause of, the fit of gasping and threatened syncope which lasted about a half minute, and which was at the time attributed to want of air from many persons crowding over the bed.

CASE IV. Was another patient at the Pennsylvania Hospital under the care of Drs. Agnew and Hewson. The man was of very intemperate habits, and while drunk had fallen off a street car on the third day of July, 1869, and had his leg crushed under the car wheel.

At the time of the operation, he was in a collapsed condition; reaction, however, took place, and the leg was amputated ten or twelve hours after. This patient did not recover. Death occurred July 19th.

CASE V. Was a patient of Dr. ———. Hemorrhage from bowels; it occurred some time during the summer of 1869. Prof. Gross was in consultation.

The patient died a few hours after the operation. In both these latter cases there had been excessive hemorrhage, and the venous system was utterly collapsed, causing very great difficulty in getting the canula into the vein, so that the operation was in neither case very satisfactorily performed.

After the experience of the first two operations I invented the bowl for the reception of the blood and keeping it warm.

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[1] Medical and Surgical Reporter, May 15, 1869.

ART. VIII.—*Case of Mollities Ossium.* By JOHN NEILL, M.D., Associate Professor of Clinical Surgery in the Hospital of the University of Pennsylvania.

So few instances of this disease have occurred in this country that I think it a duty to place upon record the following case, and at the same time to notice a few others which have been recorded elsewhere.

Mr. B., a merchant of Philadelphia, was born in Virginia, of healthy parents, one of whom died from yellow fever, and the other from ———. He was a tall, spare-built man, and although not robust, never had any disease of sufficient consequence to confine him to the house, except an attack of pneumonia of the right lung, six or eight years previously to his last illness, from which he recovered without any remaining complications. His habits were active and regular.

In the summer of 1869, he was seized with a pain in his right thigh, which was supposed to be rheumatism; and although there was very decided swelling of the ankle-joint, it did not confine him to the house, until December, when he suffered so much, that he went out but occasionally; after February, 1870, he was confined to his bed. He suffered from severe, deep-seated pain in the middle of the thigh, and the swelling of the ankle continued. He became thinner and weaker, although his appetite was not merely good, but voracious. His food seemed not to inconvenience his digestive apparatus, although but little of it was appropriated. He suffered to some extent from retention of urine, and about the last of July his suffering became very severe, and his attention was suddenly attracted to a prominence upon his thigh, which had occurred in the night.

At this period he came under my care, and I obtained this previous history from others, and not from my own observations. Upon examination of the limb, the deformity was so striking and marked, that it could not well be mistaken; the thigh was bent in the middle, almost to a right angle; the skin was very hot to the touch, and of a dusky-red appearance. Through the integuments and muscles, the bone could be felt, and there was evidently an increase of diameter at the bent portion. The foot, ankle, and lower half of the leg were œdematous, and he referred much of his pain to the ankle. The other limb was extremely emaciated, and indeed his whole body resembled that of a person in advanced and prolonged phthisis. His appetite was still good, in fact, craving; he had great zest in eating and drinking, but his digestion was impaired, and his food, instead of nourishing him, seemed only to act as an irritant to his bowels. Diarrhœa became profuse even when his diet was most carefully regulated, and medicine had very little control over it. His discharges were not only frequent, but of a most unusually offensive character.

The treatment, which consisted of nourishment, opiates, and tonics, had little or no effect, and he died September 26, 1870.

The post-mortem examination was permitted, on a promise of restricting the inspection to the diseased limb only. Upon removing the soft parts, which were there expanded, the periosteum over the diseased portions was thickened and of a deeper colour. The bone was one and three-quarters of an inch thick at the bend, and this thickness gradually diminished up and down the shaft towards the epiphyses. In the handling

to which the limb was subjected, there was no flexibility. With an ordinary large scalpel, making firm pressure, I made two semi-elliptical incisions, approaching each other through the bone, longitudinally, and deep enough to reach the medullary canal; the knife went through easily, yet the tissue had some firmness, especially under the periosteum.

Upon an examination of this section, the solid, dense, laminated structure of the shaft of the bone was entirely gone, and in its place had been elaborated a cancellated spongy structure containing oil and bloody serum. The thin edge of this section was flexible, tough, and elastic. After the piece had been washed, the walls were observed to be thinner as they approached the medullary canal, and they were semi-transparent, of a yellowish-brown colour, cartilaginous, but tougher and harder to the touch than the cut extremity of a femur which had been softened in muriatic acid for the purpose of exhibiting the animal matter of bone

The medullary canal was filled with the same material as the cancelli, a thick, dark coloured, reddish, semi-fluid pulp.

We have been able to discover but two cases of this disease which had occurred in this country, and we present an analysis of the striking features of them.

Dr. Tenny, of Webster, Mass., records in the No. of this Journal for October, 1839, p. 506, a case of a woman 43 years of age, and the mother of five children, who died after two years' illness. At first she manifested general weakness especially in her lower limbs, producing an alteration in her gait. The slightest impediment threw her down; her appetite continued good, and her stomach retained and digested food; she became unable to support her weight, and was confined to bed when her thigh-bone was found flexed at a right angle near the centre. The patient was not sensible of it until it was accidentally discovered, and supposed to be broken; but the extreme emaciation showed that the limb was bent spontaneously, and that the bones were in the same condition.

Autopsy.—Œdema of the lower extremities; upon cutting down upon the bone it was found to have been doubled over on itself in such a manner that without altering the general direction of the limb, it had shortened it about two inches, besides which there was a rectangular deformity. The bone was so soft as to be easily pierced by a scalpel. The medulla was disorganized, and the cavity appeared to be filled by a clot of blood. Immediately beneath the periosteum the bone was firmer than elsewhere, though it could be crushed between the fingers.

Dr. Jones, of New Orleans, records (*Trans. Am. Med. Assoc.*, vol. xx. 1869) a case of a young woman eighteen years of age, of humble life, being in great poverty, and supported by alms in a hovel. The father and mother were unhealthy, pale, and cadaverous, and for a long time had been the victims of malaria. The softening of the bones commenced in the leg after an attack of ague. The left humerus lost all its earthy matter for the space of five inches, and she suffered great pain; the upper and lower end seemed to be bony, but the intervening part had been converted into a flexible cartilaginous mass; the arm could be bent at right angles; the right humerus was rough and enlarged, and painful to the touch, and the right radius was apparently destroyed; the left tibia and fibula were divided or absorbed; and her mother states that this leg "was fractured at night with an audible snap." Although eighteen years of age, she was only three feet nine inches high, and weighed not more than a child four years of age.

It is believed that these are the only cases recorded as such in American journals, and in addition we give a condensed account of several others, which have been reported very fully in Dr. Jones's excellent paper.

Mr. Sylvanus Bevan, F.R.S. (*Philos. Trans.*, vol. xlii. No. 470), states that a woman in 1738 was seized with diabetes, and after eighteen months of fever and wasting and pain, was obliged to go to bed. The bones in her arms and legs became soft to the touch, and could be bent in a curve, and finally became as limber as a rag.

Post-mortem examination.—The outer laminæ of the bones were soft and membranous, containing, instead of a bony substance, a thick fluid of reddish colour. There was no appearance of bones in her legs and arms except near the joints, but what remained was soft and full of holes like a honey-comb. Those parts of the bones that were most compact and hard were dissolved first, whilst their heads, which were more spongy and soft, had not so entirely lost their substance.

Ambrose Hosty, M.D., reports (*Philos. Trans.*, vol. xlviii.) the case of Ann Elizabeth Queriot in 1753. She was 35 years of age, married, and confined three times. After her last labour she was seized with pain in her limbs, and became bed-ridden and distorted; all the bones were affected. The lower extremities turned upward, and became parallel with her body. This state was attended with exquisite pain.

Post-mortem.—Upon cutting in the left tibia some parts were entirely dissolved, and the sides were not thicker than the gristle of the ear. Instead of the marrow, a thick red matter like coagulated blood mixed with grease was found in all the bones.

John Pringle, M.D., F.R.S., reports the case (*Philos. Trans.*, 1753, vol. xlviii.) of Mary Hayes, who heard her bone snap while walking, after which the bones of the legs and thighs grew flexible. Her spine became distorted; she was confined to her bed, wasted and died, and her body was two feet shorter than when living.

Post-mortem examination.—All the bones were more or less affected, and scarcely any would resist the knife. They were so soft that they were cut through without using the edge of the knife. Those bones were most dissolved which were in the natural state most compact, and contained most marrow in their cavities, and the heads of them were the last portions dissolved. The interior was filled with a dark, pulpy, parenchymatous substance like soft dark-coloured liver.

Thomas K. Chambers, M.D., reports (*Lancet*, March 25, 1854) the case of a young woman who had a spontaneous fracture, first of one thigh and then of the other, in St. George's Hospital. She suffered great pain in both arms, which became paralyzed. The pelvis and ribs fell in, and she died in a year. The bones throughout the system were found soft and unresisting; a sharp knife could readily pass through them. A section of the tibia was of the colour of muscle, its shape being retained by the periosteum. "The microscope exhibited the bone as consisting of large fat vesicles, some containing a white and some a reddish oil. The parts next the periosteum, which felt gritty, presented, when examined under a quarter-inch object-glass, some islands of opaque bone, the bone corpuscles being indistinct and the canaliculi not to be discovered.

Mr. S. Solly reports two cases, the first (*Med.-Chir. Trans.*, vol. xxvii.) being that of a young woman whose health began to decline at nineteen, and whose bones fractured easily, and whose spine became distorted. She suffered great pain. Her head became enlarged, and her mind became affected. She was unable to stand, and had to push herself from place to place. She became much emaciated, and suffered excruciating pains in her bones. Her appetite was good. She was twenty-nine when she died.

Post-mortem examination.—A longitudinal section of the long bones showed that the osseous structure of the bone was nearly absorbed, a mere shell being left. The interior was filled with a dark grumous matter, varying in colour from that of dark blood to light-reddish liver-colour. The Haversian canals were enormously dilated, and the osseous corpuscles diminished in quantity. The joints were all healthy.

The second case (*Med.-Chir. Review*, April, 1845) was Sarah Newbury, 39 years of age; married for nine years, no children. Was robust until she had an attack of rheumatism, when she fell, and was subsequently confined to her room.

She suffered great pain in her bones, and was hardly able to walk. When her husband was carrying her, her thighs were suddenly drawn up. The spine became curved, the clavicles, which had been previously fractured, were now bent. Both thighs were broken, the left twisted inward and the right bent at an acute angle in the centre. Subsequently the right foot was completely drawn over her head, in the same position as is represented in the case of Madame Supiot, *née* Quenot. She died after eight years' sickness.

The *post-mortem* was very carefully performed, and numerous sections were made of all the bones which were generally diseased. But that of the right thigh was the most characteristic. The whole of the osseous matter had been removed, and in the centre nothing but periosteum and membranous matter left. Towards the condyles the bone was nearly of its natural colour. In the lower third the red matter was abundant, exhibiting various hues. The red matter was carefully examined by Mr. Birkett of Guy's, and Mr. Rainey of St. Thomas's Hospital, as well as by Mr. Simon of King's College.

The reader might here say that the reproducing of these cases, with some of their striking peculiarities, only shows their similarity to the case which is the occasion of this paper, and confirms the statement that the disease is not of frequent occurrence, and that but few instances are recorded.

But, upon a closer investigation of the first case, together with those condensed accounts which follow it, it will be seen that the disease has some common positive characters, and these may be stated in a general way in a few words.

Mollities ossium or osteo-malacia occurs in adult life, in persons previously healthy. It attacks the dense portions of the bone, before the spongy parts. It is attended by severe pain, which is often excruciating. Deformity suddenly occurs, of an angular character, by partial fracture or bending; and this deformity is never permanently removed. The general health fails; and though the appetite may continue, there is wasting and emaciation. No recoveries have taken place; death is certain. The post-mortem appearances show swelling of the bone and thickening of the periosteum. The middle part of the shaft, which is hard and laminated, is changed into spongy cancellated structure, which can be cut with a knife. The earthy matters of the bone are absorbed and the cells are filled with a semifluid, red, and oily substance. The bones become flexible in proportion to the degree of absorption of the earthy matter.

Although the account given above we believe to be a true and accurate description of the disease, we are bound, in view of the present literature of the subject, to present another side of the picture, and to state that not only very different but very opposite views are held as to the nature of mollities ossium, and that some of the distinguished modern writers upon pathology not only attach no faith to such an account as we have given, but equally discredit each other's views.

For instance, Rokitansky says :—

"It occurs chiefly in the bones of the trunk, and when the bones of the extremities are affected, they are so always in a subordinate degree. The deformities which result from mollities ossium are restricted to the trunk. The bones diminish in size."

Still more opposed to our views are Mr. Paget's statements, who, after examining numerous specimens in the Hunterian Museum, considers the disease essentially "fatty degeneration." He says:—

"Nothing can better express the character of the change than its similarity to fatty degeneration of other organs, in which we find the proper substances of the part gradually changed for fat, and the whole tissue spoiled, while the size and outer form of the part remain unaltered." And again, "These investigations were made in a collection containing specimens from nearly all the cases, with whose histories we are most familiar." In the second edition of Mr. Paget's valuable work, reference is made to three other cases subsequently reported, which confirm his view of fatty degeneration, and he says: "I have never seen a specimen *which appeared to fulfil in any degree the general* notion of mollities ossium as a disease, consisting in the removal of the earthy matter of the bone, and the reduction of any part of the skeleton to its cartilaginous base." And again, after opposing Rokitansky's generalization, that it occurs more frequently in *females*, and in the bones of the trunk, and that the bones are flexible and not brittle, he concluded by the following remarks: "I think we may consider that there are two diseases included under the name of mollities ossium, namely, fatty degeneration, which these specimens show, and which seems to be more frequent in England; and the simple softening of bone, or rickets of the adult, to which Rokitansky's description alludes, and in which the bones are flexible rather than brittle, and appear reduced to a cartilaginous state." After reading such statements from such authorities, it is not surprising that Mr. Holmes, in the last edition of his valuable *System of Surgery*, should say, "the pathology of mollities is far from being satisfactorily established; and there can be little doubt that this has arisen, in a great part at any rate, from the fact that authors have confounded several different conditions under the same name. Some indeed make no distinction between mollities and fragilitas ossium, while others regard mollities as an affection allied to, if not identical with, rickets."

It would occupy more space than was intended, in giving the history of a case with a few remarks, if a contrast were now instituted between rickets and fragilitas ossium, and mollities, but it is proper to notice in passing, that rickets is a disease of childhood, occurring in those of originally defective and deficient health; that it is attended with but little pain, and that recovery is the rule. There is a deficiency of supply of the earthy material, and the bones, as they grow, become flexible, and are bent by the weight of the body as well as by muscular contraction. The bones of the lower extremities are bent, the spine twisted, and the pelvic arch falls in, and when adult life is attained, and ossification is completed, the results are bandy legs, sigmoid spine, and contracted pelves.[1]

And, it might be said of fragilitas, that it is a mere symptom or result, and not truly a disease; that brittleness is a condition, dependent upon age, fatty degeneration, thinning of walls, cancer, atrophy, etc. But if we limit its meaning as is usually the case to that state which accompanies a tendency to frequency of fracture, which has been met with by almost every surgeon, and which was always supposed to be dependent upon a want of proper proportion between the animal and earthy matters of the bone, and of which so many cases are recorded in the text-books and

[1] See Dr. Parry's papers, Amer. Journ. Med. Sci., Jan. and April, 1872.

journals, it can be readily seen that neither rickets nor fragilitas correspond to the views which have been expressed upon mollities ossium. And in many of the text-books of the day, even in Mr. Erichsen's *Surgery*, mollities and fragilitas are described under one head, and Mr. Tyrrell's case, in which twenty-two fractures occurred, and also Mr. Arnott's case, in which there were thirty-one, are quoted in exemplification of the subject. Nor should these remarks be terminated without an allusion, at least, to some of the recent articles which have appeared in the journals bearing upon this subject.

Mr. Pedlar, L.R.P.C., has presented a very interesting paper (*West Riding Lunatic Asylum Reports*, vol. i. 1871), entitled "*Mollities Ossium and allied Diseases*," in which numerous cases are reported illustrative of the subject of "breaking of ribs in asylums," in which very remarkable statistics are brought forth, but we hardly think that the disease corresponds in its essentials to mollities. Dr. Geo. Warder, superintendent of the county asylum at Carmarthen, states (*Lond. Journ. Mental Science*, Jan. 1871) that of twenty bodies of patients dying in 1870, nine were found with bones in an "abnormal and diseased state." The manifestations of the disease were mostly in the ribs and sternum, and the bones were soft and easily broken down.

Dr. Ormerod's description of cases (Dr. Barnes's paper, *Obst. Trans.*, vol. xiii. 1871 ; also *Amer. Journ. Med. Sci.*, July 1872) leads us to suppose that he described some other disease than mollities.

And Dr. Casati, of the Royal School of Midwifery at Milan, records during a period of eight years "7719 deliveries, of whom sixty-two presented evidence of clearly marked osteo-malacia." Almost all of the cases came from one valley in which the people lived in damp houses, and were overworked and badly fed; forty-one of these cases had "deformed pelvis."

The most complete and perhaps the most instructive paper recently published on this subject is by Mr. Arthur E. Durham, *Guy's Hospital Reports*, 1864, 3d series, vol. x. He details three cases, the first of which presented in a marked way the characteristic symptoms of the disease.

Previously healthy woman, æt. 45, the mother of four healthy children. After her last confinement was seized with pain in her lower extremities, which became œdematous. The pain became so severe that she fainted in attempting to dress herself, and falling from the edge of the bed broke her right thigh and was sent to St. Bartholomew's Hospital, where she remained five months. No reparative action took place, and about a month afterwards, whilst her bedclothes were being changed by the nurse, the left femur gave way; she did not feel it crack, it seemed merely to bend. Deep-seated and aching pain attacked the other bones, one after another giving way, in each instance bending rather than breaking. She became much emaciated and deformed, and her sufferings were very acute. Her appetite was tolerably good. After a short time her decline became rapid, and she resembled a person in the last stage of hectic fever. At the *post-mortem* it was discovered that all the bones had undergone those changes which are characteristic of true mollities ossium.

They could without exception be cut by the knife, and for the most part with great ease. The shafts of long bones were affected to the greatest extent; and seemed to consist of a soft, greasy mass, not unlike liver in appearance, but more gelatinous in consistence, inclosed in a thickened and altered periosteum. The pelvis was not notably distorted, though its bones were softened.

Besides reporting these cases, Mr. Durham collects many others, and is able to add 14 to "Litzmann's 136, whose treatise on the subject is the most complete yet published with the exception perhaps of Beylard's."

Out of 145 patients, 13 only were males and 132 females; of the females, 91 were first affected during pregnancy or very shortly after childbirth.

There were only 10 cases affected under 20 years of age. The great majority began to suffer when between 25 and 33 years of age. In a majority of the cases not immediately connected with pregnancy or childbirth the symptoms first manifested themselves in the lower extremities. In a vast majority of the 91 cases described as commencing in connection with pregnancy, the first symptoms manifested themselves in or about the pelvis and lower part of the spine. In 73 of the cases the disease was absolutely confined to the bones of the trunk, and in a very great many cases there is no evidence of any other than the pelvic bones having been affected.

Mr. Durham raises the question as to how many of these last cases are to be regarded as examples of true mollities. And we certainly are disposed to agree with him that many of the cases which have been alluded to in the previous part of this paper as presenting obstetric difficulties should rather be considered as cases of deformed pelvis originating perhaps in some other disease. His views as to the relations of mollities to rickets and fragilitas are also decided. "Mollities ought never to have been confounded, as it has been and still appears to be in the minds of some, with rickets on the one hand, and senile fragility of the bones on the other. In rickets the primary cartilages have never become properly ossified. In senile fragility the animal matter of the bones appears to be absorbed as rapidly, if not more rapidly, than the earthy constituents, and none of the characteristic general symptoms of true mollities are present."

Without even alluding to other papers, such as Mr. Dalrymple's, in the *Dublin Journal*, vol. ii., in which microscopical and chemical investigations are detailed, we will conclude these remarks with a *resumé* from Rindfleisch, which freely confirms the views that have been expressed as to the nature of mollities.

He considers that its principal and almost only anatomical sign consists in an abstraction of lime and gradual liquefaction of the solid osseous tissue. If we break off one of the smallest of the osseous trabeculæ from the cancellated structure and treat it with carmine and then examine it microscopically, it will have the appearance presented in Fig. 182 (Rindfleisch, *Pathological Anatomy*). This osseous trabecula consists of two kinds of substances; an exterior one lying next to the medullary spaces, and to the Haversian canals; and an inner

one which follows the axis of the osseous trabecula. The inner one contains a perfectly normal osseous tissue; the bone corpuscles with their numberless anastomosing processes, and the strangely refractive thoroughly colourless basis-substance, are intact. The outer one, on the other hand, shows us a minutely striated basis-substance, coloured deep by the carmine, which only here and there exhibits small shaded lines as the last remains of formerly existing bone-corpuscles. The change which we here see before us, reminds us too much of the known change which osseous tissue undergoes in removing the lime by means of hydrochloric acid, that we could for one moment doubt that here also a decalcification of the osseous tissue (halisteresis, Frey) had taken place. This decalcification progresses upon every osseous trabecula from without inwards; we may observe its progress at the time upon the sharp line which separates the decalcified osseous tissue from the normal Herewith it is interesting to see that this line does not run parallel to the outer contour of the osseous trabecula, but in just such indented curves, such as we otherwise only perceive upon the line of resorption of the osseous tissue in inflammations, caries, etc. He advances the opinion that an acid, proceeding from the medullary spaces and the Haversian canals, robs the bone-tissue of its salts of lime. The decalcification is the first act of the bone softening. Some time afterward follows the second act, the dissolution of the decalcified bone-tissue. This also advances from the medullary spaces towards the axis of the osseous trabeculæ. The latter for some time consist only of bone-cartilage, then they become more and more thin at the centre, finally melt down and disappear from view.

ART. IX.—*Cases Illustrating the Application of Elastic Ligatures in Surgery.* BY STUART ELDRIDGE, M.D., in charge of Imperial School of Medicine, Hakodate, Japan. (With a wood-cut.)

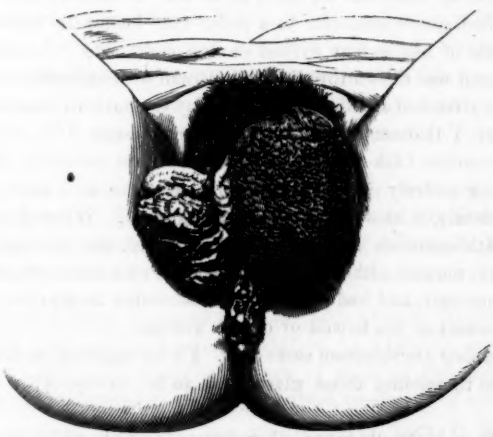
IN 1871 Mr. Henry Lee, of London, suggested that bands or cords of India-rubber might be advantageously substituted for the ordinary ligature in the strangulation of small tumours, and, more recently, Prof. Dittel, of Vienna, has independently arrived at the same conclusion while much extending the application of the idea. Prof. Dittel has operated, as our readers well know, by the rubber ligature for the removal of the testis and mamma, and has even amputated the thigh in this way, a proceeding in which he will probably be but seldom imitated.

During the year just past I have made much use of the elastic ligature for the removal of tumours, and in other cases in which gradual severance by ulceration was admissible, and with most gratifying results. I give below a few illustrative cases, premising that I have several times used the ligature in cases in which I should have preferred the knife, but in which the patients absolutely declined the more rapid operation.

1. *Vascular tumour of scalp.*—Kana Toshi, child, aged eight months. An angioma had existed upon the upper portion of the forehead since birth, and had rapidly enlarged, until, at the time I first saw the case, the tumour was larger than the half of a hen's egg, and of much the same shape; the skin very thin and vascular, not only over the tumour, but for

some distance around its base. Vaccination was tried, but with a negative result, so far as tumour was concerned, as might have been expected. June 10th, operated by rubber ligature. Two large hare-lip pins were first passed at right angles to each other, from side to side of the tumour, care being taken to pass the pins close to the pericranium so as to lie entirely below the diseased tissue. A very slight cut was then made in the skin below the pins around the base of the tumour, and into the groove thus made a thread of rubber was tightly tied. June 17th, the tumour had entirely separated save a central shred of tissue not more than one-tenth of an inch in diameter, which was cut off by the scissors. Cicatrization had so closely followed the rubber cord in its progress toward the centre that the space unhealed upon the removal of the strangulated mass was not more than one half the size of the base of the growth. July 30th, a firm, smooth, cicatrix three-quarters of an inch in diameter marks the former site of the tumour.

2. *Pedicellated fibrous tumours of external genitals.*—Sakura, prostitute, aged 20, syphilitic elephantiasis of labia majora and surrounding region. (See figure taken from a photograph.) These tumours were



exceedingly vascular, considering their fibrous character, and, as the patient entertained an invincible dread of the knife, it was resolved to remove them by ligature. July 20th slight cuts were made around the bases of the two larger tumours under local anæsthesia by carbolic acid, and small rubber bands shrunk into the grooves thus made. The base of the largest tumour was about four inches, that of the next in size about two inches in diameter. During the process of ulceration a dressing of carbolic acid solution was used to suppress fetor. July 27th. The smaller of the two tumours had separated to the normal diameter of the constricting band,

about three-eighths of an inch, and the remaining tissue was cut through with the scissors without loss of blood, the bloodvessels appearing to be sealed. July 30th. The larger tumour was found in similar condition, and its separation completed in like manner, again without hemorrhage.

The larger masses having been thus removed, several smaller tumours, of the size of a filbert to that of an almond, were strangulated by rubber thread, and in a few days dropped off. During the whole progress of the operation the patient suffered so little that her sleep was not interfered with, and it was almost impossible to prevent her running about the ward.

August 17th. Cicatrization was completed, and the cicatrices much smaller than the original cut surface. Patient discharged.

3. *Hæmorrhoids.*—K. J., male, aged 31, large external hæmorrhoids. December 14th, six ligatures of fine rubber thread were applied to as many tumours. The tumours being in a slightly inflamed condition, a line of strong carbolic acid was drawn around the base of each before the application of the ligature, though the usual incision of the skin was omitted. December 18th. The tumours have all dropped off. December 24th. Cicatrization has taken place, and the anus looks almost normal.

4. *Fistula in ano.*—G. J., male, aged 40. Fistula in ano extending from one inch above sphincter to a point two inches to left of anus; a second fistula of less extent existed on the right side. November 10th. Rubber thread was drawn through both fistulæ by means of an eyed probe, then tightly stretched and tied. The same day the patient, a sea-faring man, departed for Yokahama, but on his return, January 14th, informed me that on November 14th the ligature from the less extensive fistula came away, having entirely cut through, and, that three days later, that from the larger fistula, it also having finished its work. When I saw him on January 14th complete healing had taken place, and the action of the sphincter was normal, although, by the patient's own statement, he had been constantly on duty, and had paid but little attention to my directions as to the management of his bowels or of the wounds.

The foregoing are specimen cases only. I have operated on many others, more or less resembling those given, and, so far, always with satisfactory results.

There are undoubtedly many other circumstances in which the operation by rubber ligature will eventually be found useful. I believe it can be applied to the occlusion of arteries, perhaps even substituted for the clamp in ovariotomy, and, in a modified form, as a broad band with pad, to the cure of aneurism by distal compression.

The advantages of the rubber ligature in cases such as those detailed above, may be briefly summed up as follows:—

1. The operation is bloodless.

2. The ligature once applied requires little further attention, save in exceptional cases, but steadily cuts its way through till its elasticity is

exhausted. The pain and alarm produced by the necessarily often repeated tightening of the ordinary ligature has always formed a great objection to its use.

3. The liability to pyæmic infection would appear to be much less than in operations performed by ordinary ligature. Under the steady gentle pressure of the rubber the vessels are thoroughly occluded before being cut through by ulceration.

4. The elastic ligature is of a peculiarly non-absorbent and unirritating nature.

It should be remembered that fatty matters act upon India-rubber rather energetically, especially at the temperature of the body, so that in cases where the ligature must cut through any great depth of fatty tissue it is likely to break; but even should it do so, another can easily be substituted for the one broken. While I believe that, in all cases where gradual strangulation is indicated, the rubber ligature is to be preferred to the ordinary one of silk or other non-elastic material, I fully recognize the fact that it is open to many of the objections which have caused so many surgeons almost wholly to discard the operation by ligature in any form. I believe, however, that in at least three classes of cases, viz., vascular tumour, hæmorrhoids, and fistula in ano, it will be found the best method of operation. Further experience will show how much beyond this the use of elastic constriction may be advantageously extended.

ART. X.—*Report of Twenty Cases of Stricture of the Male Urethra, with Treatment.* By A. VANDERVEER, M.D., of Albany, N. Y. (With a wood-cut.)

THE following cases of stricture of the male urethra are presented to illustrate the treatment by gradual dilatation, by divulsion, and internal urethrotomy. They also illustrate the use of many of the more modern instruments now employed in the diagnosis and treatment of stricture.

CASE I. *Gradual dilatation; result good.*—May, 1867, C. W., unmarried, on account of intemperate habits for several years, applies for treatment. Six years ago contracted gonorrhœa; has had the disease, either in its acute or chronic stage, ever since; has practised the usual treatment with copaiba, cubebs, and various injections; noticed his stream of urine becoming small during the past three years, and now can only void it with much effort and straining; has a frequent desire to pass his urine during the night; no complete retention at any time, but fears it; desiring to be relieved, and leading a more temperate life, he is anxious for treatment; appears pale and thin, and states that he can attend to his duties only with the greatest effort. Upon examination a No. 3 black elastic olive-pointed bougie passes into the bladder. There is considerable gleety dis-

charge, and the urethra is decidedly sensitive. Meatus appears quite small; tr. ferri chloridi and fluid extract ergot ordered internally. Continued this treatment for nearly eight months, besides passing bougies two or three times weekly, gradually increasing in size, until No. 15 could be introduced with ease. The discharge ceased entirely, and the patient was directed to use the bougie occasionally, and to continue in his good habits. His general health is now excellent, and in appearance he is decidedly improved.

CASE II. *Single stricture; gradual dilatation; recovery.*—May 14, 1870, E. T. J., æt. 43, of irregular and intemperate habits, applies for treatment to relieve a troublesome and long-standing stricture. First attack of gonorrhœa in 1848; several attacks since; has pursued the usual treatment with copaiba, etc., internally, and has frequently used injections. Eight years ago noticed that the stream of urine was growing smaller, and for the past five years has emptied his bladder with great difficulty; gleety discharge during most of this time. Two years ago, while in San Francisco, was treated by means of bougies, and experienced some relief, the discharge ceasing for over a year; but, neglecting treatment, soon relapsed into his former condition. During the past year is obliged to void his urine every hour or two both night and day, and for the past three months could only relieve himself when sitting upon the water-closet, when he would, also, each time, have a small fecal evacuation from the bowels. Is unable to attend to business; is pale, and feels weak and very despondent; habits are now better, and is very anxious for a restoration of his health. Urine is alkaline; specific gravity 1020, no albumen; has never had complete retention, always being able to empty his bladder by means of hip-baths, etc. Upon examining the urethra to-day a stricture is detected about five inches back of meatus, through which, by gentle exertion, and without causing much pain, a No. 2 black elastic olive-pointed bougie passes into the bladder, but cannot pass smallest size bulbous bougie. Ordered tr. ferri, tr. cantharid., and fld. extract ergot internally.

May 15. Voids his urine with more ease, and, seeing already some improvement, is hopeful.

Sept. 10. Gradual dilatation has been practised two and three times a week; the past four weeks not so often, until now No. 14 steel sound, English scale, can be passed with little pain into the bladder. Not obliged to void his urine during the night, and only three or four times during the day; the stream is full, and under observation is voided with marked force. The discharge, which was quite profuse when dilatation was first commenced, has never ceased entirely, and the patient has gained in flesh, health, and courage; internal treatment continued.

Dec. 1. A No. 15 steel sound has beenintroduced about once a week, until now No. 16 can be passed with comparative ease; general health good; internal treatment discontinued.

June 1, 1873. Mr. J. has returned every two or three months to have No. 15 or 16 steel sound passed; health is fully restored, and urinary tract apparently as well as ever; is himself taught and directed to pass a No. 15 steel sound once a month for a year at least, and after that not so often. There has been no chill, or any unpleasant symptoms in this case, although the patient is of a very nervous temperament.

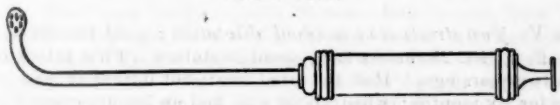
Sept. 23. Patient has passed No 15 steel sound once a month, and twice at my office I have passed No. 16; no unpleasant symptoms;

doing nicely; habits continue good. To-day, with bulbous bougie, cannot detect any contraction of urethral canal.

CASE III. *Single stricture; gradual dilatation; recovery.*—August 29, 1870. W. C., æt. 27; habits temperate; first attack of gonorrhœa 18 months ago. The attack was an aggravated one, and attended with much swelling of the penis; severe pain for many weeks in urinating, and a troublesome chordee. Had gone through the usual routine of internal treatment and injection; had taken good care of himself while under treatment. Now feels debilitated and despondent, and appears thin in flesh; frequent desire to micturate during the day and night; there is a gleety discharge present, and the stream voided is small. Upon examination with various bulbous-pointed bougies, a decided stricture is detected with a No. 2 in the membranous portion of the urethra; a No. 2 black elastic bougie passes into the bladder, but causes considerable pain. Ordered 10 ♏ tr. ferri with 8 ♏ tr. cantharid., diluted with water, four times daily, and gradual dilatation by means of elastic bougies.

Continued under treatment for six months; passed bougies two or three times a week, besides using for the last three months, after the urethra had become well dilated, a weak injection of either zinci sulph., cupri sulph., or tannin, with the syringe shown below. The long nozzle of this syringe was especially constructed for this case, and the use of the tannin has been attended with beneficial results in other cases of deep urethral inflammation.

Reversible flow.



The general health is much improved, and the discharge has now ceased entirely; not obliged to urinate during the night, and retains his urine for a longer time during the day. No. 17 steel sound is passed with ease to the patient; instructed to pass No. 14 metallic sound at least once every two weeks and to report.

Aug. 1, 1872. Has retained good health, and the urinary organs are in good condition; has continued to pass the sound once and twice a month for a year; comes occasionally to have No. 17 sound passed; has not passed the sound so frequently for the past twelve months; there is no contraction; reports himself well.

Aug. 2, 1873. W. C. came to-day to have his urethra examined. Passes a good stream, and reports himself as feeling well; no discharge; has not used the sound during the past year. Passed No. 17 steel sound with ease; ordered to pass No. 15 steel sound once a month, and to report occasionally. With No. 12 bulbous-pointed bougie cannot detect any contraction of the urethra.

CASE IV. *Traumatic stricture; gradual dilatation; recovery.*—May 5, 1871. Rev. W. E.; kicked by a horse twelve years ago, the force of the blow received on the perineum. Passed some blood with his urine shortly after the injury; no complete retention at any time, nor was a catheter introduced at the time of the injury. The swelling and ecchymosis never very severe, no abscess formed, the patient gradually recovered from the effects of the injury, and in five months after passed his urine in a full-

sized, natural stream, without pain or effort. During the subsequent five years he enjoyed good health, until after exposure to cold he had some difficulty in passing his urine; had well marked symptoms of cystitis, obliged to empty his bladder occasionally during the night, and was annoyed during the day by dysuria. The stream of urine gradually grew smaller, and it required a greater effort to empty the bladder. He has grown worse until now, when he is compelled to empty his bladder every hour or two during the day and night. The stream has grown very small, and frequently the urine is voided only in drops; has lost strength, is emaciated and much depressed in spirits, being obliged at times to give up his occupation in consequence of this trouble. Has been dosed "ad nauseam" with buchu and many other diuretics. Upon examination to-day the urethra is found to be very sensitive, and No. 3 bulbous pointed bougie is arrested in the bulbous part of the spongy portion of the urethra. No. 2 passes into the bladder, but is held firmly in attempting to withdraw it at the point of stricture. Large sized bulbous bougies pass easily through the portion of the urethra anterior to the stricture. Ordered internally tr. hyoscyamus, tr. cantharid., bicarb. potassa, and elix. cinchona, with good generous diet.

Gradual dilatation was practised for two months, when No. 13 steel sound could be passed with ease into the bladder. Patient was now relieved from passing the urine during the night, and could retain it for three or more hours during the day. Internal treatment discontinued, and patient taught and directed to pass No. 13 to No. 15 steel sound at least once a month.

CASE V. *Two strictures; gradual dilatation; good results.*—July 1, 1871. F. J., æt. 23, habits fair; small in stature. First attack of gonorrhœa two years ago. Had the usual treatment internally, and used injections for six months; when about well had an impure connection, and contracted the disease for a second time. This attack proved more severe than the first; was attended with much swelling of the penis and great dysuria, also had chordee; treatment about the same as during first attack. Has a continual gleetly discharge. Noticed about this time that the stream of urine was becoming smaller, with an increasing desire to micturate, frequently obliged to arise during the night to void his urine; has been in this state for six months previous to applying for treatment. Upon examining his urethra No. 5 bulbous bougie detects two well-marked strictures, one near the meatus, and the other in the membranous portion of the urethra. Tr. ferri and fld. ext. ergot prescribed internally. A No. 3 black elastic bougie passes into the bladder, but causes a smarting sensation at the points of stricture. Gradual dilatation was now practised two or three times a week. Continued under treatment six months. The stream now passed was full, the discharge had ceased, and he had no abnormal desire to micturate; No. 14 steel sound passed.

June 1, 1873. Has reported occasionally to have No. 14 steel sound passed; his general condition continues good.

CASE VI. *Single stricture; gradual dilatation; recovery.*—H. L., æt. 22, June 8, 1872, applied for relief of troublesome discharge from his penis. The discharge is accompanied by a frequent desire to micturate and a smarting sensation. Upon observation the stream of urine voided appears small, and requires considerable force. Is finely developed physically, and has not been subjected to exposure; habits temperate. Had his first attack of gonorrhœa in August, 1869; rather severe, from de-

scription of symptoms. The plan of treatment was with copaiba, etc., internally, until the middle of October, when, not improving as rapidly as he desired, he used, and but once, upon the advice of a friend, a strong injection of nitrate of silver. Four hours after, on attempting to micturate, found that his flow of urine had ceased, and for nearly twenty-four hours was unable to empty his bladder. This caused him great physical distress and uneasiness of mind. He was relieved at this time with some difficulty, and suffering great pain, by the introduction of a No. 8 gum-elastic catheter. After this he passed his urine naturally but in a small stream. From this time until February, 1870, he passed either No. 8 or 12 elastic bougie every other night. The discharge which was at first troubling him ceased, and passing, as he thought, a good stream, he stopped all treatment, having relied upon his own judgment as to treatment since using the injection of nitrate of silver in October, 1869.

From February, 1870, until the middle of last April he has been quite comfortable, at which time he noticed a return of the old gleety discharge, a gradual decrease in the size of the stream of urine voided, and increasing desire to micturate both night and day. Has had no exposure to a second attack of gonorrhœa. Upon examination to-day there was quite an abundant gleety discharge. Nos. 8 and 5 bulbous pointed bougies upon being introduced are successively arrested about six inches from the meatus. A No. 3 French olive-pointed black elastic bougie passes with slight effort into the bladder. Divulsion was proposed, but being decidedly opposed to the use of instruments, gradual dilatation was preferred. Ordered 10 ♏ tr. ferri after each meal; gr. j quinia every four hours.

Aug. 1. Have used bougies, gradually increasing in size, from two to three times a week, until now a No. 16 steel sound is introduced with comparative ease. Quinia was discontinued after two weeks and the iron a week ago; no chills. The discharge has now entirely ceased, and the general health is much improved. Is instructed to use the steel sound, and to pass No. 16 once a week. There is no vesical irritation; patient passes his urine as naturally as he ever has, and is not obliged to empty his bladder during the night.

March 1, 1873. Has returned to the office about every two months, and had No. 16 steel sound passed. Is free from any gleety discharge, and is feeling well.

June 3. No. 16 steel sound passes with ease into the bladder. Cautioned as to the necessity of passing the sound occasionally. Large size bulbous bougie fails to detect any contraction of the urethra.

July 29. Treatment continued, and condition remains good since last date, and gradual dilatation practised two and three times weekly. Discharge has ceased. Patient discharged, and ordered to introduce No. 15 steel sound at least once a month.

The following case of obstinate gleet is one of many met with in practice, and illustrates the folly of internal treatment in the giving of medicines, use of injections, etc., without some attempt being made in some way to restore the urethra to its normal calibre:—

CASE VII. *Obstinate gleet; single stricture; dilatation; recovery.*—September 22, 1872, D. P., æt. 27, habits temperate. First attack of gonorrhœa a year ago; not severe. Treated for six months with copaiba and injections; no treatment during the past six months. At present has an annoying discharge, especially in the morning. Exposure to cold increases

the desire to micturate; complains of an unpleasant sensation in the region of the prostate. Objects to having any instrument whatever introduced; desires to be treated only with medicines, and as he is anxious to be married, desires an immediate cure. Declined to treat the case at all unless he submits to an examination. Patient leaves in a rage.

October 20, 1872. Returns, stating that he has taken medicines without any effect upon the discharge; is willing to submit to any examination necessary. No. 5 bulbous pointed bougie detects a stricture in the membranous portion of the urethra. Gradual dilatation was begun, and tr. ferri, cantharid., and fl. ext. ergot given internally.

February 1, 1873. Patient has continued under treatment, gradual dilatation being practised twice a week until now. No. 17 steel sound can be passed with ease. No discharge. Departs cured, with the expression that the next time he will believe the doctor.

CASE VIII. *Single stricture; divulsion; recovery.*—May 31, 1871, C. J., æt. 27, intemperate, admitted to hospital to-day. First attack of gonorrhœa three years ago; made a speedy recovery by internal use of copaiba, etc.; no injections used. Second attack a year and a half after; treated for six months with internal remedies and injections; at this time there was scarcely any discharge, but did not consider himself well. Soon after this, the gleety discharge still continuing, he noticed that his stream of urine was gradually becoming smaller, the smarting pain upon passing it more marked, that it took longer to empty his bladder, and was obliged to micturate frequently both day and night. This has been the condition of the patient for the past year. During the last two months is obliged to go to the water-closet nearly every time he desires to micturate; passes upon observation no distinct stream at present. His urethra presents a congenital hypospadia, about quarter of an inch of the urethral canal being absent at the meatus. Upon examining his urethra with different sized bulbous-pointed bougies, the smallest will not pass a stricture situated in the membranous portion. After injecting the urethra with warm oil, an attempt was made to pass a whalebone guide; although persevering for several hours for three successive days, none could be introduced into the bladder.

Patient took at this time internally tr. ferri and sulph. quiniæ, and flaxseed poultices were applied to hypogastric region. Keeps his bladder empty by frequent attempts to urinate. Had concluded to perform external perineal urethrotomy, but succeeded on the fourth day in a half hour's time, and after using eight guides, in introducing one past the stricture. On this, with some effort, a No. 2 tunnelled silver catheter drawing off about a gill of ammoniacal urine. Gouley's modification of Thompson's divulsor was now passed on the guide, and the stricture apparently fully divulsed; about two drachms of blood followed the operation; suffered but little pain.

Nos. 8 and 10 steel sounds now passed with ease. Patient ordered to continue iron and quinia. No chill or unpleasant symptom following, steel sounds to No. 15 were passed with little pain. Patient discharged from hospital June 15, 1871, with instructions to have No. 15 steel sound passed occasionally.

June 1, 1873. Two years after divulsion. C. J. has reported about every two or three months; have passed each time Nos. 15 and 16 steel sound without any difficulty. Has married since the operation, and become a father. General condition good.

CASE IX. *Relapse in five years after gradual dilatation; divulsion; use of meatotome; recovery.*—December 13, 1872, C. W. (Case I) again applied for treatment concerning his former trouble. Habits have been good since last under treatment, and has married. Had employed the bougie for nearly six months, when, feeling perfectly well, he discontinued its use. During the past few months has had a more frequent desire to pass his urine; has noticed a slight gleety discharge, and also that the stream of urine is smaller. On examining his urethra with a No. 3 bulbous-pointed bougie, a stricture is detected five inches from the meatus, which holds the bougie quite firmly on attempting to withdraw it. Gradual dilatation now employed for six weeks, but No. 10 black elastic bougie gives so much pain at the meatus that I determined to incise it, and attempt divulsion upon the deeper stricture.

Feb. 1, 1873. The meatus was freely incised with Gouley's meatotome, and a No. 14 steel sound passed down to the deeper stricture; no unpleasant symptoms ensued.

17*th.* Having first introduced the whalebone guide with Gouley's modification of Thompson's divulsor, the deeper stricture was fully divulsed; slight bleeding; the operation giving him no more pain than the bougie while practising gradual dilatation. No. 14 steel sound was passed into the bladder. Iron and quinia were prescribed during a week, and no unpleasant symptoms presented. Twice a week, for ten weeks, steel sounds up to No 15 were introduced, at which time the discharge ceased, and he was discharged, with instructions to pass the No. 15 steel sound twice a month.

Oct. 1. C. W. has continued to use No. 15 steel sound weekly, feeling well and passing his urine with ease and as naturally as he ever did.

CASE X. *Single stricture; divulsion; recovery.*—May 23, 1872, W. J., æt. 34, temperate. Had first attack of gonorrhœa in May, 1865. Made an easy recovery in two months with the usual treatment without injections. In the early part of 1868 had a second attack, symptoms not more severe than the first. Used the same treatment for a year, but still had a constant gleety discharge. At this time was advised to use a strong injection of sulphate of copper, which caused him great pain, and resulted in almost complete retention. Has since abandoned all treatment; has had great difficulty in urinating, and can now pass but a small stream, and at times but a succession of drops. Obliged to micturate frequently during the night, and is frequently unable to perform the act without being seated upon the water-closet, and often has a passage from the bowels at the same time. Is at present thin and emaciated. Upon examining his urethra to-day with a bulbous bougie a stricture is found in the membranous portion, through which only a whalebone guide can be passed, and only after a half hour's steady perseverance, using six guides. No. 2 tunnelled steel sound was first passed on the whalebone guide, then the tunnelled divulsor and the stricture fully divulsed, with little pain and slight hemorrhage. No. 12 steel sound was now passed into the bladder. Ordered quinia and tr. ferri.

June 1. No unpleasant symptoms have followed. A No. 15 steel sound has been passed daily without great pain. Not obliged to empty his bladder during the night; is much improved; treatment to be continued.

Aug. 10. Patient has reported every two weeks, and had Nos. 15 and 16 steel sound passed. Condition is very much better. Internal treatment discontinued. Ordered to pass sound occasionally.

Oct. 30, 1873. W. J. has not reported since last note of case until to-

day. . . sound used since Aug. 10, 1872. Passes a good stream. No. 16 steel sound passes with little pain into the bladder. Bulbous bougie fails to detect any remains of stricture.

CASE XI. *Single stricture; divulsion; recovery.*—H. J., æt. 45; hotel keeper, of intemperate habits. First attack of gonorrhœa in 1848, said to have been complicated with chancre in urethra. Treated with mild injections. Symptoms subsided in six to eight weeks. No difficulty in passing his urine after this attack. Second attack in 1861, which readily yielded to treatment in four or five weeks. No trouble in voiding urine after this—passing a good stream. Had a third attack in March, 1868, which proved to be more severe, the discharge making its appearance freely forty-eight hours after exposure. Treated as before with injection, etc.; had a severe attack of orchitis when partially cured Had from the beginning difficulty in voiding his urine, while he noticed with anxiety that the stream was gradually growing smaller. After eight weeks' treatment he thought the discharge had entirely ceased, but since has had great difficulty in voiding his urine. Obliged to frequently void his urine drop by drop, both day and night. Sometimes would consume fifteen minutes in emptying his bladder, and at times obliged to assume almost every possible position to effect it.

November 30, 1872. Upon examination to-day a stricture is detected five inches back from the glans penis or meatus. After using several whalebone guides, one passed the stricture with slight effort, and entered the bladder. Upon this No. 2 tunnelled sound, then Gouley's No. 3 tunnelled silver catheter was passed, and through the latter the urine now flowed freely. Thompson's tunnelled divulsor was then introduced, and the stricture freely divulsed; pain not severe; slight hemorrhage. Immediately after No. 15 steel sound was passed; patient complaining of very little pain. Ordered internally 1 gr. quinia every three hours, and 10 ♏ tr. ferri three times daily. This treatment was continued for a week, no chill or unpleasant symptom following. Nos. 15 and 16 steel sound were passed every other night. After this No. 16 sound was passed weekly for a month. Internal treatment now discontinued, and patient warned of the necessity of having sound passed occasionally. Has, however, not since reported.

CASE XII. *Traumatic stricture; partial divulsion; urethral fever; gradual dilatation; recovery.*—May 11, 1872. McC. E, æt. 24; unmarried; temperate habits. While following his daily occupation—paper hanger—fell astride of a step-ladder, and received a severe contusion on the perineum. States that he did not void his urine nor pass blood after the fall, but that the urine was drawn on the 12th, 13th, and 14th, and noticed an escape of blood after the use of the catheter. After the 14th, he passed his urine with the aid of warm hip-baths and anodynes, until July 20th, when he could only void it in drops. Has a constant desire to micturate, and can only do so with great effort when seated upon a vessel. At this time I was called to see him in consultation with his attending physician, Dr. Maguire. Upon examination with a bulbous-pointed bougie, it was arrested in the membranous portion of the urethra, and after injecting the canal with warm oil, no ordinary instrument would pass the point of stricture. After an hour's effort with whalebone guides, one was finally passed into the bladder, upon this No. 2 tunnelled sound, and then Thompson's divulsor; the latter causing such great pain and distress the divulsion was not completed. After this, however, the urine

passed more freely, but the imperfect divulsion was followed by severe urethral fever, which did not yield for several days to the use of quinia in large doses, tr. aconite, anodynes, external application of heat, etc., etc.

July 25. The urethral fever has subsided and only No. 7 steel sound can be introduced with gentleness into the bladder, causing little or no pain. No great pain following the use of the steel sound, gradual dilatation was practised up to September 1, 1872, when No. 18 steel sound could be passed into the bladder with very little pain. No. 17 and 18 steel sounds were now passed once a month.

September 10, 1873. Patient, at request of Dr. M., reported to-day, and No. 18 steel sound can be passed with ease. Condition good. No vesical irritation. Directed to use No. 17 steel sound once every month or two.

CASE XIII. *Two strictures; use of meatotome; dilatation; divulsion; partial recovery.*—S. C., æt. 26, unmarried; habits temperate. July 10, 1872. The patient presents himself to-day with the following history. It is here given verbatim: "First noticed a slight discharge from the penis on the evening of the 27th of June, 1871, having on the 24th previous been in a drenching storm all day and thoroughly wet through; took sandalwood oil without any perceptible effect for three weeks; then took cubebs and copaiba paste for about a month; neither a diminution nor increase of the discharge; consulted a physician who gave me uva ursi and an injection of sulphate of zinc. Up to this time, about two months having elapsed, had no trouble in urinating, there appearing to be no inflammation, no chordee, nothing but the simple discharge. After using the injection a short time, the penis began to swell, the discharge became copious, and micturition very painful. This state of things lasted for a great while, during which time I had used several different injections and a variety of prescriptions. But finding no benefit I stopped taking medicines, and simply used a wash of sal soda, by which I succeeded in keeping the parts perfectly clean and in reducing the inflammation. Then took cannabis and cantharides—homœopathically—but without any apparent benefit."

Upon examining the urethra with a No. 3 bulbous-pointed bougie, a stricture is detected just behind the meatus, and another in the membranous portion of the urethra. There is a free gleety discharge, with a constant desire to micturate. The stream of urine has gradually decreased in size, and it requires great effort on the part of the patient to empty his bladder. The stricture behind the meatus was incised with a common bistoury, and Nos. 10 and 12 elastic bougies passed down to the deeper one. Slight hemorrhage. Directed to use No. 12 bougie, and to introduce it for two inches; but the discharge ceasing, he neglected himself and applied for no further treatment until August 24, 1873. The stream of urine was decidedly small, and the desire to micturate frequent. Obliged to empty his bladder frequently during the night. No. 2 bulbous-pointed bougie will hardly pass the stricture back of the meatus, but passes the deeper stricture with ease. The stricture near the meatus was now freely incised with the meatotome; hemorrhage profuse and arrested with some difficulty. No. 14 steel sound passes down to the deeper stricture. Sound passed for four successive days, and at each time the hemorrhage was quite annoying.

August 29. Being exposed to a cold rain, the patient had severe chills followed by diarrhœa and exacerbations of fever for nearly a week. Urine scanty, and micturition attended with much pain in lumbar and hypo-

gastric regions. Iron and quinia ordered internally, with heat, etc., to be applied externally. No sound having been passed during the illness of the patient, the stricture back of the meatus had again somewhat contracted.

September 7. Patient being in good condition, a whalebone guide was passed with little effort through the deeper stricture into the bladder, on this No. 2 tunnelled sound, then No. 3 tunnelled silver catheter, and about a gill of urine withdrawn. After this, Gouley's modification of Thompson's divulsor was introduced, and the stricture in the membranous portion of urethra thoroughly divulsed, attended with much pain and some hemorrhage. No. 10 steel sound was now readily passed into the bladder. Quinia and iron ordered to be continued. No unpleasant symptoms followed.

19*th*. Gradual dilatation having been practised daily, and No. 13 steel sound scarcely passing the meatus, the latter is again freely incised with the meatotome. Hemorrhage considerable. Nos. 15 and 16 steel sound passed for a short distance.

October 1. Patient's condition good, except sensitiveness of the urethra near the deeper stricture. The passage of a larger than No. 10 steel sound causes much pain and distress at this point. Directed to continue the use of tr. ferri with mucilaginous drinks.

November 1, 1873. Gradual dilatation has been continued until now. No. 13 steel sound is passed with comparative ease. Ordered to continue treatment.

CASE XIV. *Three strictures; divulsion; gradual dilatation; use of meatotome, and Gouley's dilating urethrotome; recovery.*—C. T. A., sent from Bennington, Vt., for treatment; æt. 30; of intemperate and irregular habits; saloon keeper. Two years ago had first attack of gonorrhœa, very severe in character, and attended with chordee and painful micturition. Considerable time elapsed before the symptoms subsided, and has not been free from a gleety discharge since. Injections were used with bal. copaiba, etc., internally for some time. A year ago had second attack of gonorrhœa, for which the usual treatment was pursued for three months without injections. Gleety discharge has continued. Six months ago, after an impure connection, noticed a chancre on the outer surface of the glans penis, which yielded readily to treatment; very little internal treatment. During last three months has voided his urine with some difficulty, having also a frequent desire to micturate, and requiring a long time to empty the bladder. The stream of urine has become gradually smaller, until at times it could only be passed in drops. Is obliged to empty his bladder frequently during the night. For the past year has himself occasionally passed a No. 5 English bougie; has not made use of it during the past six weeks, being unable to introduce it for any distance into the urethra.

March 20, 1873. Applies to-day for treatment, fearing that if he is not soon relieved, he will be altogether unable to void his urine. His mouth, upon examination, presents several mucous patches, and there are patches and condylomata about the anus. Upon examining the urethra with a No. 6 bulbous-pointed bougie a stricture is detected just back of the meatus; it is also arrested at a point 5½ inches from the meatus. No. 3 will not pass this point. After some effort with eight whalebone guides, one is finally passed into the bladder, upon which a No. 2 tunnelled sound was guided with little effort, and attended with no pain. A No. 3 tunnelled

catheter was now passed, and a small quantity of urine was withdrawn, showing that the instrument had passed into the bladder. The patient being unable to leave his business, and wishing to return home the next day, I determined not to operate on the stricture near the meatus at present, but to use the divulsor on the deeper one. The instrument was passed easily on the guide, and the stricture was divulsed until the index marked No. 12, when, there being much pain, I desisted, about half a drachm of blood following the operation. Ordered to take 1 gr. quinia every three hours, and report in the morning.

21*st*. Called this morning, stating that he had not passed so comfortable a night for a long time. Passes, he says, a good stream; no chill or fever. A No. 9 Thompson's steel sound was now passed with ease and little pain. Ordered to drink flaxseed tea, continue quinia, to keep quiet, and to remain in the city for another day at least.

22*d*. No chill or fever. The introduction of No. 9 steel sound is attended with little pain. Complains of considerable pain near meatus when attempting to introduce No. 10. Being anxious to return home, he is ordered the same treatment as before, and in addition a gargle of potass. chlor. and ammon. mur. for his throat, and to return in three days.

26*th*. Is feeling much better; no chill or fever; passes his urine less frequently and better than for a year past No. 9 steel sound is introduced with ease. I now wished to incise t stricture near the meatus, but the patient being obliged to return home desired me to wait for a few days longer. Same treatment to be continued.

31*st*. States that his throat and anus are troubling him, but feels much improved as regards his urinary difficulty. The stricture near the meatus was now incised with the meatotome, and a No. 11 steel sound passed with little pain into the bladder. Very little hemorrhage. Ordered to introduce night and morning a No. 12 elastic bougie an inch into the urethra, so as to prevent contraction of the stricture near the meatus. Ordered to take, two or three times daily, a pill of the following: ℞. Hydrarg. chlor. corrosiv. gr. $\frac{1}{2}$; extract hyoscyam., extract gentian., āā gr. j; ferri chlorid. gr. $\frac{1}{4}$, M.; and ung. hydrarg. ammoniat. to be applied to the anus two or three times daily. Also to continue gargle for throat. Ordered to report in a few days.

April 5. No chill or fever; progressing finely; feels much improved in every respect; obliged to urinate but once or twice during the night. No. 13 steel sound passes with little difficulty. To continue treatment and report in a week.

12*th*. Secondary symptoms improved; sleeps well during the whole night, and states that he is passing his urine as well as ever. Nos. 13 and 14 steel sounds pass with ease, but No. 15 causes much pain about two inches back from the meatus, and at the meatus itself. With a No. 10 bulbous pointed bougie a well-defined stricture is detected two and a half inches from the meatus. This stricture is to be incised with Gouley's urethrotome. To continue treatment.

24*th*. Has not reported on account of marked improvement. Same instruments as were used on the 12th, now introduced with ease; condition good. Wishing to return, he is instructed to use No. 14 steel sound and to pass it every four days, and to report in two weeks. To continue treatment for secondary symptoms.

May 10. Has used No. 14 sound without difficulty, and is much improved in health, secondary symptoms having subsided very decidedly.

No. 15 steel sound causing much pain at the meatus when introduced, the latter was again freely incised with the urethrotome, when Nos. 15 and 16 were passed, but causing much pain at the stricture, two and a half inches back, ordered to use large bougie, and keep the meatus well opened.

15*th*. No. 15 steel sound is introduced without difficulty. Wishing to return, he is ordered to use No. 15 twice a week, and to await results before treating the stricture two and a half inches back.

August 1. The stricture two and a half inches back from the meatus was freely incised with Gouley's dilating urethrotome, and No. 16 steel sound passed into the bladder with ease; very little hemorrhage followed. General health very much improved; directed to use No. 15 Thompson's sound every two weeks. The throat symptoms becoming troublesome, he is directed to take three of the pills prescribed before daily.

September 1. Mr. A. reports himself as doing well; passes Nos. 15 and 16 steel sound without difficulty. Urinates as when in perfect health. Continued treatment.

CASE XV. *Abscess and vesical fistula in perineum, also fistula in ano; two strictures; gradual dilatation and use of Vollemier's divulsor; good result.*—Service of Dr. J. H. Armsby. October 28, 1871, McC. D., æt. 24, pale, emaciated, admitted to hospital to-day. Has had several attacks of gonorrhœa; treated internally, and also used injections, etc. Upon examination a fistulous opening is discovered on the left side, and in front of the anus, connecting with the bowel and also the urethra. There is continual discharge of fecal matter and gas, and also of urine when he attempts to urinate. Quinia and tr. ferri ordered internally with generous diet; passes a moderate sized stream of urine, but with difficulty.

November 20, 1871. This condition having improved, the fistula in ano was operated on in the usual manner. Twelve to fourteen hours after the operation an alarming hemorrhage set in, and was finally controlled with the greatest difficulty by means of liq. ferri subsulph. and compressed sponge. Although considerably weakened by the hemorrhage, the operation proved successful as regards the fistula in ano. The fistulous connection with the urethra still remained open, and urine escaped whenever an attempt was made to empty the bladder.

January 1, 1872. Service of Dr. Vanderveer; McC. D. is still in bed, but improving slowly.

20*th*. Having had some trouble in voiding his urine, a careful examination was made which revealed two strictures in spongy portion, one two inches, the other four inches from the meatus. After some effort a small whalebone guide was passed into the bladder, and on this Gouley's No. 3 tunnelled silver catheter; about a pint of urine was withdrawn. On account of the great pain attending the operation he was anæsthetized. This exhausting him very rapidly, the catheter only was passed. By aid of a No. 3 elastic bougie urine was passed much more easily, and with more freedom than for a year past; several chills and a sharp urethral fever followed the operation. Being in a weak condition, the iron and quinia were continued, and further operative proceeding abandoned for the time being.

March 1. Patient is improving and is about the ward. Dr. Swinburne, while in temporary charge, during illness of Dr. Vanderveer, finding the patient in good condition, after having chloroformed him, passed Vollemier's divulsor and ruptured both strictures; considerable hemorrhage

following, but no other unpleasant symptoms. Nos. 8 and 10 steel sounds were now passed with ease. Patient was directed to pass No. 10 steel sound. The fistula in the perineum connecting with the urethra is now entirely healed. Discharged from the hospital June 1, 1872. Patient not heard from since.

CASE XVI. *Two strictures; use of meatotome and urethrotome; urethral fever; recovery.* Reported by Dr. Whitehorn, house physician, July 25, 1873.—R. W., Greenville, Greene Co., N. Y., æt. 28, strong and robust constitution; admitted to hospital as a private patient. Contracted gonorrhœa four and one half years ago, for which he consulted no physician until it had become a chronic gleet. Eight months after thought he had recovered, when after an occasional spree, he noticed a discharge which continued for a week at a time; was in this condition for a year, when he sought medical advice. Bougies were used, the discharge ceased, and he micturated freely again for six months. About this time drinking freely of cider, the discharge again appeared. There was also renewed dysuria. Took bal. copaib. and spts. æth. nitros., with some relief. Up to four months ago his condition became more and more aggravated, when he could only pass his urine by drops, and with more comfort when seated upon a bench than otherwise. This condition was alike at all times, being obliged to micturate every few minutes, else the urine dribbled away; had sharp momentary pain in inguinal region when nearly through micturating. Upon examination to-day (July 25, 1873) a slight stricture is detected half a inch back of the meatus, and another in the spongy portion of the urethra, through which No. 3 bulbous-pointed bougie will not pass. Urine of a pale colour, slightly acid; no albumen. Ordered, R. pulv. Tully grs. v, every two hours. R. tr. ferri chlorid. ♏x, three times daily. R. inf. ulmi, as a drink ad libit.

26*th*. Bowels moved freely; feels somewhat better; slept fairly; with some trouble a whalebone guide is introduced, on this No. 2 tunnelled sound, then No. 3 tunnelled silver catheter, after which the urine was voided with comparative ease.

27*th*. Slept well; urinated freely throughout the day; appetite improving.

28*th*. Condition as yesterday; this P. M. divided first stricture with the meatotome; operation almost painless; now passed No. 14 steel sound through and as far as second stricture; very little hemorrhage.

29*th*. Improving; during the forenoon introduced No. 16 sound through divided stricture; attended with considerable pain and hemorrhage; no other unfavourable symptoms.

30*th*. Nos. 14 and 16 sounds were introduced down to second stricture with but little pain and hemorrhage.

31*st*. Doing well.

August 1. Condition good; at 12 M. introduced Gouley's urethrotome upon guide, and divided second stricture from before backward on floor of the urethra. Passed No. 10 sound into the bladder, attended with very little pain and hemorrhage. At 3 P. M., patient was seized with rigors; applied hot water to feet and extra blankets ordered; relieved in about five minutes; pulse 90, soft and full; skin warm and moist; countenance anxious. Shortly afterwards, attempting to use the commode contrary to orders, he suddenly became faint and much prostrated; pulse 100, soft and full; profuse perspiration; face wan and anxious; respiration sighing; voice weak; stimulants administered cautiously. Shortly afterwards again seized

with rigors; applied heat to feet and spine, sinapism to epigastrium (to relieve nausea). Gradual improvement; 9 P. M. temp. 103°; pulse 98 to 104; skin moist. Ordered ℞. quiniæ sulph. grs. iij, every two hours. ℞. infus. lini sem. for a drink ad libit. To continue the iron; hot hop pillows applied to lumbar region; large flaxseed poultice over abdomen.

2*d*. 8. A. M., passed a sleepless but comfortable night until 3 A. M., when he had a slight chill, lasting but a few minutes; usual treatment; micturated once during the night, passing about 8 oz. of urine; pulse 80; temp. 99°; countenance cheerful and light; no sound used. 3 P. M., was again seized with rigors for a few minutes, followed by profuse perspiration; pulse 84; temp. 102°. 9 P. M., pulse 74; temp. 99⅓°; usual treatment.

3*d*. 8 A. M., pulse 74; temp. 99°; doing well. 3.15 P. M., had a chill lasting fifteen minutes; great prostration; pulse 96; temp. 103⅔°. 9 P. M., pulse 74; temp. 103⅓°; skin warm and moist; usual treatment combined with quinia; hot hop pillows and poultices were applied.

4*th*. 8 A. M., pulse 74; temp. 99°; passed a comfortable night under influence of Tully powder. ℞. pil. quiniæ sulph. gr. j, five every two hours up to 6 P. M. 3 P. M., though no unfavourable symptoms manifested themselves, ordered hot applications as a preventive to chill. 9 P. M., pulse 98. Free secretion of urine; passed No. 8 steel sound.

5*th*. 9 A. M., pulse 66, regular and strong; tongue furred; slept well; skin moist and warm. 9 P. M., pulse 54; temp. 96°; appetite good, and sleeps occasionally. From 8 A. M. to 6 P. M., took 5 grs. quinia every two hours, using at the same time hot applications as before; now decreased the quinia to grs. iij, every two hours.

6*th*. 9 A. M., pulse 75; temp. 97°; slept well; appetite good; bowels regular. 9 P. M., pulse 68; temp. 97⅓°; passed No. 10 sound.

7*th*. 9 A. M., pulse 69; temp. 98°; doing well.

8*th*. 9 A. M., pulse 70; temp. 97°; doing well. At 4 P. M., introduced Nos. 10 and 12 steel sounds without trouble. At 6 P. M., had a slight chill; pulse 102; temp. 100°. Continued usual treatment, and gave ℞. tr. aconiti. rad. gtt. ij every two hours. 11 P. M., feeling much better.

9*th*. 9 A. M., slept well; pulse 72; temp. 98°. From this time until his discharge, August 11th, his progress towards recovery was uninterrupted. He had 10 ♏ tr. ferri three times daily and one grain of quinia every three hours. The urethra admitted the easy passage of No. 16 Thompson's sound.

October 1. R. W. has reported every two weeks, and No. 16 Thompson's sound was passed. Is improving in general health and strength. Is given No. 16 black elastic bougie, and directed to pass it himself once a week. Has continued the use of the iron and quinia since leaving the hospital, 10 drops of the former, and three grains of the latter three times a day.

CASE XVII. *Gradual dilatation; use of urethrotome; stricture of large calibre and use of Gouley's dilating urethrotome; recovery.*—December 10, 1872, D. C. M. A., æt. 35; health good; habits temperate. Had a severe attack of gonorrhœa five years ago; treated with copaiba internally and injections; has had a slight gleety discharge since. Two years ago had cystitis, and since then complains of much pain, and a sensation of heat in the region of the prostate gland. There has been a frequent desire to micturate, and obliged to arise two or three times during the night to empty his bladder. Has also noticed during the past six months

that the stream of urine has become quite small. Upon examination with a No. 5 bulbous-pointed bougie, a stricture is detected one-quarter inch back from meatus, and another in the membranous portion of the urethra. Ordered tr. ferri and fluid extract ergot internally. Gradual dilatation was practised upon the deeper stricture two and three times a week until March 1st. The strictures being very unyielding and the introduction of No. 10 steel sound causing great pain at the meatus, the latter, including the first stricture, were freely incised with the meatotome; the patient desiring not to have divulsion performed upon the deeper stricture. No. 14 steel sound passed down to the deeper stricture. No unpleasant symptom followed. The use of the meatotome caused much less pain than the bougie or sound while practising gradual dilatation. The deeper stricture was now gradually dilated.

May 1. On passing No. 15 steel sound there is great pain at the meatus, which had somewhat contracted; this was again incised, with no unpleasant symptom following. The discharge has now ceased; micturates freely and with ease; reports himself as feeling very well; internal treatment discontinued.

July 1, 1873. No. 16 steel sound has been passed once a week; patient improving; instructed to use a No. 12 elastic bougie once a week, and to report occasionally.

August 1. S. returns reporting that for the past two weeks has noticed occasionally in the morning a moisture about the meatus, and that it annoys him; notices also after urinating, when he believes the act completed, an escape of several drops of urine. Upon examining his urethra carefully with a No. 11 bulbous-pointed bougie, a stricture of large calibre is detected three inches from the meatus. Gouley's dilating urethrotome was then introduced, the stricture well dilated and incised; considerable hemorrhage followed and continued for nearly two days. No. 17 steel sound was now introduced with no unpleasant symptom following; no stricture can be detected at present.

September 1. Nos. 16 and 17 steel sounds have been passed weekly; noticed no moisture of the lips in the morning, and no dribbling of urine after emptying his bladder.

25*th*. Patient continues well; passing No. 16. steel sound about once a week.

CASE XVIII. *Five strictures; gradual dilatation; use of meatotome; partial recovery; patient to return for further treatment.*—September 2, 1873. McG. J. F., æt. 45; habits temperate; first attack of gonorrhœa in 1868; was very severe in character and attended with much swelling of penis; painful chordee and a very profuse discharge; treated with little benefit for nearly a year with copaiba, etc. During most of this time the discharge continued, attended with much pain and scalding, and a frequent desire to micturate. He finally refused any further treatment, and after a short time found himself somewhat improved. During 1870, notwithstanding a constant gleety discharge, he was quite comfortable, not being obliged to pass his urine so often, and effecting it with comparative ease. During the early part of 1871 he was kicked by a horse, receiving the force of the blow in the testicles and penis. These organs swelled very rapidly, became very ecchymotic, and patient was confined to his bed in consequence during several weeks. Passed frequently small quantities of urine mixed with blood; no complete retention; six months after recovering from the injury he had sufficiently recovered to again attend to his duties.

He now noticed that the stream of urine was smaller than usual, but could always empty his bladder; obliged to micturate frequently during the night. In November, 1872, while riding a vicious horse he was thrown against the horn of the saddle and injured his penis and testicle for a second time. The swelling and ecchymosis were as great as when first injured; greater dysuria; and attended with hæmaturia; confined to the house during two weeks. From this time until September 2, 1873, he has gradually grown worse, voiding his urine from twenty-five to thirty times a day, and very often during the night, always attended with excruciating pain. It takes him from five to ten minutes each time to empty his bladder. To-day he presents himself for treatment; is much emaciated and depressed in spirits; has tried all the different "pathies," and has very little faith in any treatment. Upon examination the under surface of the urethra feels roughened and indurated, and there is found in the perineum a swelling about the size of a hen's egg. The latter has developed itself gradually during the past three weeks, and he is certain that it grows larger when attempting to urinate, and decreases in size after emptying his bladder; the swelling is hard to the touch; very painful, and especially so on attempting to urinate.

Upon attempting to explore the urethra, after injecting the same with warm oil, the smallest bulbous-pointed bougie is arrested about two inches from the meatus, and detects two well-defined strictures at this point, beyond which it will not pass. After some effort and the use of five whalebone guides, one is finally passed into the bladder; on this a No. 2 tunnelled sound, and then, although attended with great pain, Gouley's No. 3 tunnelled silver catheter, through which about two ounces of very offensive urine passed; some hemorrhage followed. No. 3 bulbous-pointed bougie now detects four well-defined strictures in the spongy portion of the urethra, one near the meatus, and the others about three-quarters of an inch apart. The same bougie also detects a stricture in membranous part of urethra, passing it and entering the bladder, causing great pain all along the urethra, and eliciting from him the remark that he would have to be anæsthetized if the operation was to be repeated; ordered rest, tr. ferri et quiniæ sulph. internally, and the application of linseed meal poultices to the perineum and hypogastric regions.

September 4. No chill; passes his urine with more ease and less frequently; feels encouraged; internal treatment continued. No. 3 black elastic bougie passes with ease, and little complaint on part of patient.

October 15. Has continued the iron and quinia; improved in appearance; has gained strength and appetite, and is very much encouraged; elastic bougies have been passed every day or two, the urethra gradually becoming accustomed to their use, until No. 10 passes with little pain, excepting at the meatus. The swelling in the perineum has entirely disappeared; not obliged to empty his bladder during the night, and but once every two hours during the day; the passage of No. 10 steel sound causing some pain at the meatus, the latter is incised with the meatotome; very little hemorrhage: ordered to continue quinia and iron.

22*d*. To-day passed No. 10 steel sound with ease into the bladder. The swelling in the perineum has entirely disappeared. Is passing a good stream, and not obliged to empty his bladder during the night.

The patient is called away from the city for six weeks; is ordered and instructed to pass a No. 10 elastic bougie two or three times weekly.

CASE XIX. *Two strictures; gradual dilatation; divulsion; partial recovery.*—April 12, 1872. McG. H., æt. 28; intemperate and dissipated; contracted first attack of gonorrhœa five years ago; recovered in about three months after pursuing the usual treatment; no injection used. After three years had another attack, which proved to be severe; was treated for a long time with copaiba, etc., internally; also used a variety of injections; has had a constant gleety discharge since last attack, which increased after connection and was frequently attended with scalding and a profuse yellow discharge.

Condition would improve with internal treatment; habits bad to within two months, when he stopped drinking, etc. Upon examination, two strictures are detected four and one half, and five inches from meatus. The stream of urine has been growing smaller during the last three months, and is voided with difficulty. No. 3 black elastic French bougie passes with some effort into the bladder.

June 20, 1872. He has taken internally tr. ferri, ergot, and cantharides; elastic bougies, gradually increasing in size, have been passed two or three times a week until No. 10 gives so much pain that he objects; a whalebone guide was now passed and upon it Gouley's modification of Thompson's divulsor, and both strictures thoroughly divulsed; less painful than the passage of the bougies; passed No. 12 steel sound; iron and quinia ordered internally.

July 2. No unpleasant symptom followed the divulsion; discharge almost entirely ceased; passed No. 13 steel sound; health much improved and feels encouraged; not obliged to void his urine during the night.

November 1. Have introduced No. 13 and 14 steel sounds once or twice a week with little effort; ordered to pass sound occasionally.

July 27, 1873. Reports for first time to-day since last November; habits have been good; feels excellent; passes a good stream; no gleety discharge; has passed the sound but a few times. Upon examining his urethra, only No. 10 sound can be passed; the stricture four and one-half inches from meatus has contracted considerably; the second one, five inches from meatus, cannot be detected with a bulbous-pointed bougie which passes the first stricture. Promises to call once a week until first stricture is dilated, or internal urethrotomy performed; no further internal treatment, as health is excellent.

October 1. Has failed to call again.

CASE XX. *Six strictures; gradual dilatation; use of meatotome; result partial; case still under treatment.*—W. H. J., æt. 27; irregular habits; had first attack of gonorrhœa five years ago; used a strong injection of sugar of lead (20 grs. to ℥j). This aggravated his trouble, and for three months he passed bloody urine. A year after had a second attack; after this "a sore," as he terms it, formed on the under surface of the penis; an abscess following, a physician lanced it, and patient states "that he cut into the urethra." The abscess filled again and was lanced; after this he improved.

Two years ago had another attack, when an abscess again formed in the same place; had it lanced again, and states that "it healed by the external application of calomel." Five months ago had a chancre for which he was treated by a physician; the abscess again filled, and for this he now applies for treatment; first noticed that he had a stricture four years ago; gradually grew worse until two years ago, when he had almost complete retention. He was in the west, and a surgeon there operated on him while

under the influence of chloroform; was obliged to use a bougie once a month after this for a year.

September 10, 1873. To-day on applying for treatment he states that for the past two months he has not been able to use the bougie; that his stream of urine has been gradually growing smaller, until now it is frequently passed only in drops; that it requires great force on his part; that two weeks ago the fistulous opening on the under surface of the penis began discharging urine, and has given him much pain and annoyance since. On examination the meatus will scarcely admit No. 5 bulbous-pointed bougie, and is arrested three-quarters of an inch back from the meatus. The smallest sized elliptical bulbous bougie is with some effort, and after injecting the urethra with warm oil, passed into the bladder. On introducing it a stricture is detected in membranous part, and four distinct ones in the spongy portion of the urethra, also one at the meatus. The fistulous opening is about midway in spongy portion of the urethra externally, and communicates with the internal portion of the canal about one-half inch further back. A small silver probe can be passed through into the urethra. There is an unpleasant gleety discharge; urethra very sensitive; patient is compelled to pass urine very often day and night; ordered internally tr. ferri; also, gradual dilatation is commenced.

24*th*. No. 8 olive-pointed bougie can now be passed into the bladder; the fistulous track has closed; passes urine with more ease; treatment continued.

October 10. To-day No. 10 elastic bougie, giving much pain in stricture near meatus, the latter is freely incised; hemorrhage quite profuse and not easily controlled; is much improved in appearance and general health; ordered to pass No. 12 bougie beyond meatus night and morning.

14*th*. Though the hemorrhage has been somewhat troublesome it is now arrested, and can, with ease, pass No. 10 steel sound into the bladder; says he is sure that he is passing a larger stream than he ever did; is not obliged to empty his bladder at night; the gleety discharge has diminished. On examining his urethra with No. 5 bulbous-pointed bougie, which passes without much trouble into the bladder, all the strictures spoken of can be distinctly defined. The use of Gouley's dilating urethrotome is suggested for treating strictures in the spongy portion of the urethra, but he objects so decidedly that gradual dilatation is necessarily continued; internal treatment continued.

November 10. Patient remains about the same; the attempt to pass a larger than No. 10 steel sound causes great pain in spongy portion of the urethra.

Gleety discharge has about ceased, and patient is feeling, as he says, about well; has gained much in health and flesh. On a proper representation of his case, he states that after having attended to some very important business matters, will allow the use of such instruments as we think best.

Internal treatment discontinued; use of No. 10 steel sound continued twice a week.

From the foregoing cases we are led to believe that the treatment of stricture, by gradual dilatation when possible, is by far the simplest and safest method. That at first, in this method of treatment, the soft olive-pointed bougie is the best, until No. 7 or 8 is reached, and then the metallic sound is more rapid in its results and equally as safe.

That to insure success the gradual dilatation must be kept up for years at intervals.

That in strictures of small calibre, where it is only possible to introduce the whalebone guide, divulsion in the membranous portion, and internal urethrotomy in the spongy portion, are the better methods.

That strictures in the spongy portion, in consequence of their painful character, do not well bear treatment by gradual dilatation, particularly if the case is one of long standing.

In the cases which we have presented we see well exhibited some of the complications met with in the treatment of stricture, such as urethral fever and hemorrhage.

One case illustrates well the treatment of stricture of large calibre by means of the dilating urethrotome.

ART. XI.—*Cases of Penetrating Wound of the Abdomen and Chest, with Remarks upon the Treatment of such Injuries.* By JAMES C. REA, M.D., Resident Physician to the Episcopal Hospital, Philadelphia.

CASE I. *Penetrating Wound of Abdomen, with Protrusion of Omentum.*—M. E., a young married woman, was admitted to the Episcopal Hospital about 1 A. M. of January 4, 1874, having been stabbed in the abdomen by her husband some three hours previously. The wound was situated on the left side, just above the anterior superior spinous process of the ilium, and extended about one and a half inches from this point upwards and outwards; the omentum had protruded when the patient fell after the wound was received, and, when she entered the hospital, projected in a mass the size of the fist, and was somewhat congested, though there had been no bleeding from its surface. An attempt was immediately made to return the protrusion by gentle manipulation, with the patient lying on her right side, but without success. Cloths moistened with tepid water were then placed over the wound, and half a grain of morphia given by the mouth. The patient was allowed milk as desired, and kept fully under the influence of morphia. Twelve hours after the receipt of the injury, the attending surgeon, Dr. John Ashhurst, Jr., passed two ligatures of strong hempen cord through the centre of the pedicle of the protruding mass, one-quarter of an inch from the line of the wound, tying each ligature separately so as to strangulate the part in two halves. The ligated portion was then cut off half an inch beyond the ligatures, and the pedicle secured beneath the skin and superficial tissues of the wound, the wound itself being closed with silver sutures and dressed with lint soaked in olive oil. The patient was given milk exclusively for diet, and a pill of calomel gr. $\frac{1}{6}$, with pulv. opii gr. $\frac{1}{4}$ every three hours; in the evening there was some pain, localized about the seat of injury, but no symptoms of diffused peritonitis.

Jan. 5. Had several evacuations during the night, but slept well in the intervals; tongue slightly coated, and patient somewhat feverish; changed

the pill of calomel and opium powder to calomel gr. ⅛; Dover's powder gr. iij, every three hours. Pulse A. M. and P. M. 100.

6*th*. Renewed the dressing; the wound looking well; considerable induration in the vicinity of the wound from local changes in the peritoneum; pulse A. M. 98, P. M. 104; gave f℥j whiskey every six hours in milk.

7*th*. Tongue cleaning; patient takes milk freely; gave in place of calomel and opium pill of 6th, quiniæ sulph. gr. ij, with pulv. opii gr. ss four times daily, and tr. ferri chlor. gtt. xx t. d.; patient has a desire for food, and is allowed farina and beef-tea.

8*th*. Wound looks well; patient in good condition.

10*th*. The induration about the injury has gradually increased until it presents a tumour in the abdomen the size of an orange, very hard and unyielding to the touch; allowed soup and broiled beef.

12*th*. Ligatures came away leaving a sinus one inch deep; the wound contracting.

15*th*. Gave quiniæ sulph. gr. 12 in the day in place of the pill of quinia and opium of 7th.

22*d*. For several days patient has complained of pain in the limb of the injured side with hyperæsthesia of its entire surface; noticed for the first time œdema of the leg with some knotting of the veins, apparently due to pressure of the mass of lymph on the recurrent vessels, and resembling in every respect the milk leg of pregnancy; bathing with a liniment of chloroform and tincture of aconite for a few days relieved the pain, and the other symptoms gradually subsided.

27*th*. Reduced whiskey to two fluidounces in the course of the day; takes house diet.

Feb. 18. Wound entirely healed and patient allowed to move about the ward in a wheel chair.

22*d*. The œdema of the leg with pain and knotting of veins has returned; patient ordered to be put to bed, and friction with liniment applied, as in the previous attack.

March 2. Patient discharged; able to walk short distances, but there is a tendency to œdema on exertion of any kind in the erect posture.

CASE II. *Penetrating Wound of Chest, with Pneumothorax and marked Emphysema.*—A. E., husband of the subject of Case I., admitted January 4, 1874, with a self-inflicted penetrating wound of the chest on the left side between the fourth and fifth ribs, one inch outside the mammary line. When first examined there was considerable emphysema of the walls of the chest, with pneumothorax; the emphysema afterwards extended until the whole side from the clavicle to near the hip became implicated. The wound was about one inch in length, cleanly cut, and was closed with one silver suture, and fine gauze and collodion, with a firm compress of dry lint. There was no evidence of the lung having been injured, no severe pleuritic pain at any time, nor any effusion into the pleural cavity. For the first few days the patient complained of slight pain on deep inspiration. His diet was limited to milk alone, and he was given a pill of calomel gr. ss, opii pulv. gr. ¼, every four hours. On the morning of January 5 his tongue was slightly coated; mouth and fauces dry; pulse 68; patient drinks milk in large quantities.

Jan. 7. The emphysema diminishing; stopped the pill of opium and calomel.

10*th*. Wound healed; emphysema entirely gone, and the vesicular murmur, which at first could hardly be distinguished, is now returning to the

lung on the injured side; the pneumothorax is also lessening every day; given house diet.

19*th.* Discharged, able to walk about without inconvenience; the lung sounds almost normal; one month after was reported as being entirely well.

Case III. *Penetrating Wound of Chest; Pneumothorax.*—W. G., labourer, aged 21, admitted March 1, 1874, with three punctured wounds of the chest, situated just under the nipple of the left side; the wounds, each half an inch in length, had been inflicted with a pocket knife. Patient had also a flesh wound in the left arm. He was brought to the hospital immediately, reaching it probably twenty minutes after receiving the injury; there was then pneumothorax, and the lung sounds were much diminished in strength; the movement of the chest on the injured side was also laboured and somewhat painful. After closing the wounds with adhesive strips and compresses of dry lint, the injured side was immovably fixed with broad bands of adhesive plaster, as in cases of fractured ribs; this gave much relief and entirely eased the pain in respiration. Patient was then allowed milk as desired, and given opium gr. ¼, with calomel gr. ss, every four hours.

March 2. Tongue coated but moist: some pain in lower part of chest, no pleuritic rales or symptoms of effusion.

4*th.* Tongue cleaning; no pain in chest; allowed some beef-tea and corn starch; opium and calomel pill every six hours.

5*th.* Pneumothorax diminished; murmur returning in the lung; allowed bread.

7*th.* Patient allowed to get up; has a good appetite; stopped the opium and mercury pill; given house diet.

10*th.* Removed the adhesive strips for the first time; no pain on full inspiration; vesicular murmur still somewhat suppressed.

16*th.* Discharged cured; respiratory sounds normal, and the movements of the chest symmetrical and unaccompanied by pain.

Remarks.—These cases, apart from their intrinsic interest as examples of recovery from severe injuries, seem worthy of record as bearing upon the vexed question of the *constitutional treatment* to be adopted in the management of penetrating wounds of the great cavities. In the first place, it will be observed that in none of the cases was *blood-letting*, either general or local, found necessary. Secondly, what is called *absolute diet* was not prescribed in any instance, but on the contrary the patients were encouraged from the very beginning to take as much milk as possible, and in the course of a few days were given beef-tea in addition, while in Case I. the use of alcoholic stimulus was resorted to at an early period. Thirdly, *opium* was freely administered in all the cases, combined at first with small doses of *calomel* with a view of obtaining what may be called the anticipatory antiphlogistic effect of this remedy; of course had the bowel been wounded in Case I. mercury would not have been given, for fear of increasing the risk of fecal extravasation, but it is believed that this drug exercises a salutary influence upon the reparative process in wounds of serous membranes. *Quinia* and *iron* were given in large doses during convalescence in Case I. Finally, attention is invited to these cases as

illustrations of the benefit to be derived from the *restorative method* in wounds of the thoracic and abdominal cavities—a method which it is believed is destined to win as much favour in surgical as it has already in medical practice.

ART. XII.—*A Case of Lumbar Colotomy for Obstruction of the Rectum by Cancerous Tumours of the Womb.* By JOHN H. PACKARD, M.D., one of the Surgeons to the Episcopal Hospital, Philadelphia.

MRS. H., æt. 49, was seen by me, with Dr. J. M. Boisnot, February 4, 1874. She had been for about a year under homœopathic treatment on account of uterine trouble; and although her sufferings had steadily increased, the physicians had told her that she had no serious disease, and held out constant hopes of recovery. On examination, we found a very abundant cancerous deposit occupying the vaginal walls, bleeding freely at the slightest touch. The uterus was the seat of a massive tumour, so large as to encroach upon the calibre of the rectum, and to produce, by mechanical interference with the passage of feces, the most intense distress. As this last-named symptom was the chief source of her suffering, lumbar colotomy was advised, merely as a palliative. She was fully informed that the operation would probably not prolong her life, and that it might possibly shorten it; but she and her family were anxious to have the chance of temporary relief thus offered.

The operation was accordingly performed, February 7, in presence of Drs. Gross and Levis, and Mr. Vogler, a student with Dr. Boisnot. Ether having been administered to complete anæsthesia, an incision about four inches long was made, slightly curving outwards and downwards from the upper and outer corner of the left quadratus lumborum muscle. The underlying tissues were successively divided on a grooved director to nearly the same extent, until the layer of fat was reached which concealed the gut. This latter was rendered somewhat more difficult to find and identify, from the fact that the patient had for some time been afraid to eat more than just enough to sustain life; and from the mechanical conditions of the case, preventing the artificial distention of the bowel by throwing in either air or liquid. It was, however, hooked up with the finger, and caught with forceps, when two hempen threads were passed through its walls. An opening about an inch long was now made in it, and the edges at once turned over and secured to those of the skin-wound by eight or ten sutures of fine silver wire. For a day or two the wound was somewhat painful; it was dressed with a weak solution of carbolic acid. The bowels were moved through it a few hours after the operation, and subsequently about every forty-eight hours. Some nausea and vomiting occurred as the effects of the anæsthetic passed off, but were controlled by means of ice and carbonic acid water. A slight tendency to protrusion of the bowel at the artificial anus was readily overcome by the use of a compress and bandage.

At the present time, fifteen weeks since the operation, Mrs. H. remains quite comfortable; her only suffering is from the original disease, which has, of course, steadily progressed. A day or two ago she took

quite a long drive, with no other inconvenience than that due to the jolting of the carriage. There is not now, nor has there ever been, any unpleasant odour from the fecal discharges, which are readily obtained at intervals of from twenty-four to forty-eight hours. There is sometimes some annoyance from the accumulation of feces in the cul-de-sac formed by the gut below the lumbar opening; but it is not serious, and is generally overcome by the use of enemata.

It certainly seems strange that obstruction of the bowel should be so rarely produced by uterine tumours, in view of the great frequency of the latter. Mr. Hawkins, in the table of forty-eight cases appended to his admirable paper on Colotomy, in vol. xxxv. of the *Medico-Chirurgical Transactions*, mentions one (No. 41) in which colotomy was rendered necessary by cancer of the womb, there being also an adhesion of the ileum to this organ; and one (No. 47) in which the bowel was obstructed by fibrous tumours of the uterus. In the former case death ensued in twelve hours, while in the latter it was postponed eighteen days, and then took place from sloughing of the wound. Dr. Erskine Mason, in his valuable and exhaustive article in the number of this Journal for October, 1873, has also given an account of one case in which the uterus, rectum, and vagina were involved in cancerous disease, causing obstruction of the bowel, for which colotomy was performed. Death occurred three months afterwards from exhaustion. Besides this case, there is in his table another (No. 68) in which the rectum was occluded by cancer extending from the uterus, and the operation gave relief, death occurring from peritonitis four months and five days afterwards.

In the same volume of the *Med.-Chir. Transactions* with the paper of Mr. Hawkins, above quoted, there is a table of one hundred cases of uterine cancer, by Dr. Robert Lee; among these there were six in which perforation of the wall of the rectum is noted to have occurred, but none in which obstruction of the gut is mentioned. This latter symptom is indeed hinted at as among the possible results of cancer of the womb, by Walshe, Simpson, and others; but it cannot be so frequently met with as might, *à priori*, be supposed, or it would be more dwelt upon, and the means of its relief distinctly pointed out. When, however, obstruction of the bowel does occur, the symptoms are so distressing, and the agony by which life is worn out is so lingering and painful, that the advantage of colotomy can hardly be over-estimated. Of this the case I have reported seems to afford a striking instance. The attention recently drawn to this operation may warrant me in adding a few remarks upon the subject.

It can hardly be expected that this procedure can ever be looked upon, in the great majority of cases requiring it, as anything but a palliative. A case is indeed on record in which it was done for the relief of fistula in ano, and the patient recovered, the fistulous openings healing, and the artificial anus also becoming closed. Either the reporter of this case, M. Dufresne, in communicating it to the Académie de Médecine, in Au-

gust, 1844, or the correspondent of the *Medical Times* (vol. x. p. 446) remarks: "This case, which has no precedent in its favour, may astonish some persons, and the operation be considered as not indicated. All that can be said is, that Duguesceau's talent was sufficient to enable him to form an opinion as to the absolute necessity of the operation ere he performed it." It certainly seems as if the remedy were rather a heroic one for any ordinary case of anal fistula. Another case is mentioned in the same report, in which colotomy was performed on a man "whose abdomen had been penetrated by a cart-stake." Here, also, in the absence of further detail, it is somewhat difficult to imagine what the symptoms may have been which led the surgeon to open the colon. We are told that in this instance, in 1793, the operation "had succeeded;" but whether this means that the artificial opening ultimately closed, leaving the patient in his original state of health, or merely that life was prolonged, does not appear.

Whether the operation of colotomy is merely palliative, or may afford a chance of radical cure, must depend, in every case, upon the curability of the disease for which it is proposed. Thus there are perhaps some strictures of the rectum, not cancerous in their nature, in which the affording of a temporary artificial outlet for the feces may render it possible to apply other remedial measures with a happier effect; but the question would arise whether the advantage thus gained would really be worth the trouble and inconvenience the operation must entail.

In the case of children with imperforate anus, not penetrable by the usual operation, it certainly seems as if for them death were preferable to the chance of bearing about, from infancy to old age, the burden of an infirmity so mortifying, and so disqualifying from all the enjoyments of childhood and youth, as that of an artificial anus in the loin or groin. And yet the moral question arises, whether it is not the first duty of the surgeon to preserve life, at the earliest as well as at the latest period? And it would surely be a wrong for him to decide such a point without laying all the facts of the case before the parents, and at least letting the onus of its solution rest on them. With adults it is far different; and the operation may be urged strenuously in view of the great value of the merely palliative advantages it affords.

One or two points may be referred to, finally, as to the performance of the operation.

The oblique incision seems to me to offer great advantages over either the vertical or the transverse; it affords more room to work in than the former, especially where the space between the last rib and the crista ilii is limited; and it is more easily kept closed than the transverse—at least if, in the latter, any of the fibres of the quadratus lumborum muscle are divided.

The rule given by Allingham and others, to divide the deeper layers of

tissue to the same extent as the outer, lest the operator find himself working at the bottom of a conical hole, is a very important one. It must be remembered that the operation is undertaken in order to afford a free exit to the contents of the bowel; and this will not be accomplished if the deeper structures are insufficiently divided. Nor is anything gained by limiting the extent of the deeper sections, since there is no additional control gained thereby over the evacuation of liquid feces, while the difficulty of getting rid of any solid masses is much increased. And, by parity of reasoning, the incision through the wall of the bowel should be of ample size—an inch at least; this makes the securing of the edges to those of the wound in the skin much easier, and does not add to the risk of protrusion of the bowel.

An adequate number of silver wire sutures should be used to insure the complete contact of the everted wall of the gut with the skin; and these sutures need not be disturbed for weeks, unless they give rise to distinct annoyance by the twisted ends irritating the tissues.

1926 SPRUCE STREET, May, 1874.

ART. XIII.—*Alcoholism, Rheumatism, Bromo-iodism, Cerebral Embolism* (?), *Aphasia, Paralysis; Recovery.* By A. F. A. KING, M.D., one of the Physicians to Providence Hospital, Washington, D. C., etc.

HENRY W., labourer, aged 50, entered Providence Hospital November 18th, 1873. My annual period of attendance in the Institution beginning December 1st, I did not see the patient till that time. By reference to the record, however, I found his disease had been registered "alcoholism," but his indulgence in drink had been limited and transient. Not by any means a drunkard or "old toper," he had been intoxicated only a few days, and from careless exposure during that time had contracted rheumatism, which at the date of my first attendance was his chief complaint. He had been the victim of rheumatic inflammation on former occasions, but there was no history of cardiac complication, *nor could any physical signs of heart disease be discovered* on the most careful examination with Cammann's stethoscope, and none have been since developed. Bowels habitually constipated. Ankles swollen and painful, as were also the fingers, knuckles, and metacarpo-phalangeal joints, especially on the right hand. Ordered: ℞.—Ammon. bromid. ʒss; aq. camph. ʒv; syr. g. acaciæ, ʒij; morph. sulph. gr. j.—M. Sig.—Tablespoonful three times a day.

Dec. 18. Has continued medicine, with occasional doses of castor oil, without much benefit. Stop bromide mixture and take potass. iodid. ʒiij; aq. camph. ʒiij.—M. Sig.—Teaspoonful three times a day. ℞. Pulv. Doveri, gr. x at night. Painful joints painted with tinct. iodine.

24th. Rheumatic inflammation a little improved. Gums, mouth, and inside of cheeks sore; increased flow of saliva. To have mouth wash of alum and tr. myrrh. Dose of castor oil. Stop other medicines.

30*th.* Sore mouth getting better. Rheumatism about the same. R.— Vin. colch. sem. gtt. xv, three times a day. Continue mouth wash. Pulv. Doveri at night.

Jan. 1. Rheumatism rapidly improving. Mouth better. Still continues "wash" and colchicum with occasional anodyne at night.

He has been all along, and still continues in good spirits, without anemia, and takes no stimulants.

8*th.* Rheumatism getting well fast. Joints but little red or swollen. Can clasp a hand, and clench his own fist without pain.

On being questioned this morning, he was aphasic, answering "I can't," "I can't," but could say nothing else. On repeating questions to him he frowned, scratched his head (on the left side anteriorly, which, however, may have been *accidental*, I mean as to *location*), and set his teeth like a schoolboy puzzling over a sum in arithmetic, and then, rolling his cranium from side to side on the pillow, became agitated and embarrassed, and finally shed tears in a childish manner. On being instructed to nod or shake the head for "Yes" or "No" in response to questions, he did so with perfect intelligence. The mouth was drawn to the left side in so slight a degree as to be almost imperceptible. On protruding the tongue he could not hold it steady, but the organ appeared to move from right to left and *vice versa* with equal facility. Pupils normal and respond to light. He drags the right leg in walking, and there is slight paralysis of the right arm. Sensation in all parts unimpaired. To stop all medicines except castor oil when required.

The heart was again carefully examined, but no signs of disease in it could be discovered.

10*th.* The aphasic symptoms continue without change. Paralysis, especially of leg, has considerably increased. He cannot walk without assistance. On standing unsupported, with the eyes shut, he cannot balance himself, the tendency to fall being mostly backwards. No other head symptoms; no constitutional disturbance; appetite tolerably good. Frequent micturition during the last two days (but never before) has been his chief complaint. Cannot retain the urine; has also had involuntary evacuations from bowels on one or two occasions. The urine on examination was found to contain an abundant deposit of triple phosphate prisms.

13*th.* The aphasia is better. He can say a good many more words, but fails in many others. Cannot name articles presented before him although he knows what they are, but when the name is spoken by another he can repeat it indistinctly and with difficulty. Palsy of leg and arm also improving. The right hand and arm have been more painful lately, but there is not much heat or swelling in the affected joints. His last two nights have been restless, and he has repeatedly fallen out of bed.

During the remainder of January and February he gradually regained the use of his palsied limbs as well as the voice. He has been anemic, but takes nothing but good food and iron.

March 1. Left the hospital of his own accord. For the last six weeks he has been steadily improving. The rheumatism is quite gone. He walks without a stick. The paralysis of the right hand, arm, and leg is nearly well, though their *power* is still somewhat impaired. A little "thickness of speech" still remains. The vesical and rectal sphincters have regained their integrity except that when having, as it were, consented to urinate, the water flows before he can get to the closet. The

urine is clear and almost devoid of phosphates. The appetite and digestion are both good, and he is in jolly spirits. No medicine has been given in the last few weeks except tinct. ferri chloridi and occasional doses of castor oil.

Remarks.—Since this case recovered we are (and fortunately) left in doubt as to its exact pathology, and may therefore be allowed to theorize in regard to it. We presume it to have been embolism of the left middle cerebral artery. The embolic body was probably detached from the heart or aorta, and *this* despite the absence of physical signs, for while it is true that organic changes of a certain prodigious degree can be discovered generally by physical examination, it must be admitted that lesser degrees of structural change may altogether escape detection. The embolism we presume was slowly disintegrated by fatty metamorphosis, before any extensive cerebral softening had taken place, though that *some* organic cerebral change had occurred was indicated by the urinary deposit.

A question of great practical importance is this: Was not the embolism really produced by the medicines employed to relieve rheumatism? In other words, did not the salivation, or the blood changes incident to it, produced by the excess of bromides and iodides, lead to the separation of an embolism that would otherwise have remained securely attached to its seat in the heart or aorta? If the truth could be known, this question, we apprehend, would have to be answered in the affirmative. In the absence of proof we may at least enjoin additional caution while administering these two oft-used haloids for prolonged rheumatic inflammation.

ART. XIV.—*Case of Fracture of the Neck of the Femur treated by a New Apparatus.* By J. C. BISHOP, M.D., of Middleport, Ohio. (With a wood-cut.)

ON the evening of March 13th, 1873, I was hastily summoned to Mrs. D., æt. 78; nervo-bilious temperament, well nourished, and vigorous for her age, and obtained the following history of the case:—

About sundown, while walking along a narrow pavement in the outskirts of the village, made by placing narrow boards side by side on short pieces of scantling, which were allowed to project somewhat over an accompanying drain, she struck her foot against some inequality in the pavement, and fell, striking the upper portion of the left thigh against one of the projecting pieces of scantling, and was unable to rise; and when lifted to her feet, was unable to stand or even move the left foot from the ground. She was carried some distance home on a lounge, and, before being placed in bed, made another unsuccessful attempt to stand, the foot hanging uselessly on the floor. At the time of the fall she "felt something give way" at the hip, and from that time experienced intense pain in the hip-joint, extending along the thigh to the knee, *especially*

severe on any attempt to move the injured limb. An examination by comparison with the unaffected side showed *flattening of the trochanter;* measurement indicated from *one to one and a half inches shortening.* There was well-marked *eversion of the foot,* the heel of the injured limb rested above the malleolus of the opposite leg, and slight *crepitus.* Diagnosis: fracture, probably intra-capsular, of the cervix femoris, with, of course, a doubtful prognosis. An anodyne was prescribed, and, with a promise to call on the following morning, I left. Knowing the difficulty in obtaining favourable results in the treatment of this injury when occurring in *aged* persons, on account of the necessary and protracted *confinement to bed in one position,* imposed by the various contrivances recommended, therefore it occurred to me that the long splint of Liston, Physick's modification of Desault's, and Gibson's modification of Hagedorn's, were alike objectionable in this case, because they imposed *too much* of this *confinement,* while the proceeding recommended by Sir Astley Cooper, of simply supporting the limb on pillows, *demanded too little.* Now, if an apparatus could be devised which would occupy a *middle* ground, and, while it maintained the proper coaptation of the fragments, would permit the necessary movements of the body (the previous robust health of the patient considered), it would at least offer *some* chance for a favourable result. At my next visit I found the patient irritable, despondent, and wearied. She informed me that she had not been able to lie on the back for even a few hours at a time for years, and that she had frequently suffered from attacks of dyspnœa, and palpitations while lying in that position. Here was a positive contra-indication to protracted dorsal confinement; and what exerted no particularly salutary influence mentally, was a knowledge of the fact that a sister had died a few years before from a similar injury. I then made accurate measurement of the size of the hip, thigh, knee, and ankle, with distance from anterior superior spinous process of ilium to the knee and foot, and constructed a *splint of wire,* slightly larger than the measurement, to conform to the shape of the hip and limb throughout, which would retain the knee flexed at an angle of about 45°. This wire splint was so fashioned as to envelop the outer surface of the hip and limb, so that, when applied, it should cover slightly more than half the circumference of the leg, and, extending to the waist, it could be firmly fastened there, while, at its distal extremity, the foot would be retained in its natural position. This "splint" was composed of (see figure) four small wires,

about the size of a No. 10 bougie, bent in the shape desired, and placed longitudinally, and supported by circular wires of the same size, placed transversely at a distance of from four to six inches from each other, and soldered firmly to the crossings of the longitudinal wires, while the latter, at their upper extremity, were in turn as firmly soldered to a tin band one and one-half inches in width. The inner surface of this splint was covered first with a single layer of muslin, then well padded with raw cotton, and over this another layer of muslin, which was so fastened as to retain the

cotton and first layer of muslin in place. Into this the entire limb was placed after securing the necessary apposition of the ends of the bones, and secured by application of the roller, so as to equalize the circulation by rendering an equal pressure throughout. The upper end was firmly secured around the waist by a broad padded bandage, while the lower end held the foot. The wire was kept in place for six weeks before its removal, although, after the first few days, broad bands of muslin were substituted for the roller. After the sixth week it was removed for a short time daily, the time being gradually extended, until the eighth week it was left off entirely, and passive motion instituted; and to-day, slightly more than one year from the date of the injury, this aged lady walks without the assistance of a cane even up and down stairs, almost as sprightly as before the accident, with only a perceptible limp, the result of less than one-half inch of shortening. During the progress of the case the patient was enabled to change her position so frequently that she was almost entirely free from that distressing complication—"bed-sores," only one of which made its appearance, and that on the natis of the right side, and which yielded kindly to a few applications of calomel alone. No other untoward symptoms were manifest during the entire time to the period of recovery.

It will be seen that the position of the limb, as maintained by this apparatus, is after the manner of the "double-inclined plane," with slight extension and counter-extension; the upper extremity fastened around the waist, acting as the counter-extending force, while the foot, confined to the foot-piece of the wire, together with the flexed position of the knee, is sufficient extending force. The author claims that this apparatus, in the treatment of fractures of the neck of the femur, gives perfect rest to the part, and at the same time a certain freedom of movement of the rest of the body, which is no less essential, and, under protracted confinement, much less irksome than when treated by the ordinary appliances. It will not be denied that absolute confinement on the back, especially in aged patients, has been a fruitful source of mortality, and caused many a failure to produce satisfactory results in this class of cases in the hands of some of the most eminent surgeons in Europe and America. Another advantage claimed is, its *lightness* and *firmness*. In ordinary cases the wire used in its construction need not be so heavy as those used in the construction of my splint, and at the same time sufficient firmness may be secured. As it is, it is even lighter than any of the splints constructed of wood with which I am acquainted. Again, the padding may be of such material and so light as to permit perfect ventilation through it, thus supplying an essential element to the integrity of the limb, which is prevented by the great majority of the appliances now in use. I am not aware that any precisely similar instrument has ever been employed in this class of cases; and I would earnestly recommend it to the notice of the profession, with the assurance that it will be found to fulfil the indications in the treatment of fractures, not of intra-capsular alone, but in those occurring without the capsule, in both aged persons and in the younger subjects as well. The excellent result afforded in this very unpromising case I have no doubt is due wholly

to the apparatus by keeping the joint at perfect rest, while great freedom of movement of the body was permitted; and that it will act equally as well in the future I am well satisfied.

April 9, 1874.

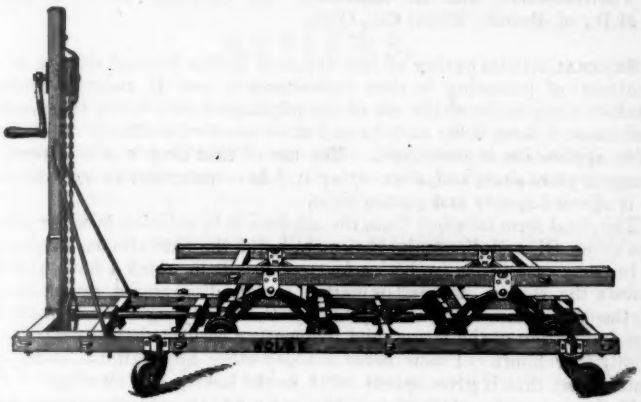
ART. XV.—*Description of a Hospital Bed-Elevator and Carriage, designed especially for Surgical Wards.* By THOMAS G. MORTON, M.D., Surgeon to Pennsylvania Hospital, and Emeritus Surgeon to Wills (Ophthalmic) Hospital. (With a wood-cut.)

THE transfer of surgical or medical cases without discomfort to the patient, from ward to ward or to and from the amphitheatre for clinical demonstration, operation, or otherwise, has, for a long time, been a matter of considerable interest to me; and I have, with others, for years past thought that some contrivance might be devised to move serious or suffering cases.

The transfer of patients in bed for cleaning a ward, or for any other purpose, requires, in most cases at least, three and often four assistants, and when the patient is upon a water-bed it is found impossible, unless the water is first emptied. All hospital surgeons must have observed how often patients, with serious and painful diseases, have suffered intensely at times from the jarring incident to their removal to the lecture-room or from ward to ward; more frequently the convalescents in a surgical ward are detailed for the work, or at least to assist, and generally but little care is bestowed on the careful carriage of the sufferer. For these reasons, some two or more years ago, it occurred to me that a truck might be constructed with an elevating apparatus so arranged that, after being pushed underneath a bed, it could then be made to lift both bed and patient from the ground, while, the apparatus being on wheels, transportation could be easy and without shock or jarring.

With the assistance of Mr. R. F. Shreiner, the apparatus, which is shown in the accompanying figure, was devised and placed in successful operation. It was made in the spring of 1872, and was on exhibition at the College of Physicians at the time of the meeting of the American Medical Association in Philadelphia, in May of that year, and since that time has been in constant daily use at the Pennsylvania Hospital, where it has been found indispensable. The apparatus can be readily manipulated by one person, although two can move it about more comfortably. When in the clinic room the patient upon his bed can, with ease, be moved in various directions for class demonstration without discomfort to the patient or annoyance to the lecturer.

The apparatus consists, as will be seen by a reference to the wood-cut, of a double truck, the upper one elevated by a series of cams which run



upon a narrow iron track; a long right and left screw, worked by an endless chain upon a crank at one end raises and depresses the cams. The apparatus is made of oak, and the hinges of brass, the wheels are supported by steel pins. By experiment it has been found that four hundred pounds can be lifted quite free from the floor in four seconds, and without difficulty a water-bed, which weighs about seven hundred pounds, with patient, can be elevated and readily moved. The elevation of the bed an inch from the ground is all that is required. The apparatus, if properly made, will not readily get out of order; the first one placed in the Pennsylvania Hospital remained in good working order, without repair, nearly two years, since then a second has been required, and has been found to work very satisfactorily, and is essentially labour-saving.

Such an apparatus would have been of very great service in our army hospitals, especially those constructed after the plan of the Mower Hospital, at Chestnut Hill, Philadelphia, where the wards, some forty-eight or more in number, all diverged from a circle upon the same level.

The apparatus measures six feet five inches in length by two feet five and one-half inches in width; it can thus be readily passed under our beds at the Pennsylvania Hospital, which measure six feet five inches in length by two feet six and one-half inches in width, and are one foot three and a half inches in the clear from the floor to the under surface of the bed. Some slight variation in the construction of the apparatus would be required in order to suit the different forms of hospital beds; but, as a rule, most of these have the same general size and make up. The adaptation of a lever instead of the screw movement has been suggested, but so far, I have not been able to apply the elevating power by this method.

ART XVI.—*Sulphate of Zinc in the Treatment of Poisoning by Rhus Toxicodendron and R. Radicans.* By CHARLES H. HUMPHREYS, M.D., of Brandt, Miami Co., Ohio.

SEVERAL articles having of late appeared in this Journal relative to the treatment of poisoning by rhus toxicodendron and R. radicans, without mention being made of the use of the sulphate of zinc in the treatment of such cases, I deem it my duty to call attention to the efficacy of that salt as an application in such cases. The use of that drug was suggested to me some years since, and, after trying it, I have since used no other remedy, as it afforded speedy and certain relief.

The usual form in which I use the sulphate is in solution in water, about ℥ss to aq. Oj, and direct the patient to bathe the part affected frequently.

In every case (some twelve or fourteen in all) in which I have used the remedy the vesicles and inflammation rapidly disappeared, desquamation of the skin commencing usually in less than forty-eight hours from the first application of the lotion, and frequently a decided change occurring in twenty-four hours. I now never use any other application—as the patients assert that it gives speedy relief to the itching and burning.

My last case was that of a young man, æt. 16, who has always been susceptible to the subtle influences of the rhus, "getting poisoned if he only *looked* at his enemy," as he expressed it. Both hands and wrists were inflamed, and enormously swollen. In urinating he conveyed the poison to his penis, affecting the whole organ, and the scrotum, the lower part of the abdomen, and part of the thighs. The prepuce was swollen to the size of a common orange and distended with fluid, giving it almost a transparent appearance; there was phimosis, completely hiding from view the glans; the scrotum was enormously swollen. I was sorely tempted to puncture the prepuce, but decided to try the zinc, which produced absorption of the fluid in thirty-six hours, and in forty-eight hours the skin was rapidly desiccating, and in a few days all traces of the disease had disappeared.

Some weeks ago I was asked to visit a man about 40 years of age, poisoned with rhus. I found him delirious, and with considerable fever; pulse 110, tongue thickly coated, bowels constipated. Upon the face was an eruption of an erysipelatous nature, and from the amount of constitutional disturbance I was led to believe it a case of facial erysipelas, until informed by my patient's wife that a few days previous, while in the woods, he had come in contact with poison-oak, and upon returning home remarked that he would again be poisoned, that it shortly did make its appearance, first upon the nose, thence spreading over the cheeks and eyes. The inflammation had extended over the forehead and into the scalp, both eyes were quite closed, both ears, cheeks, and lips were very much tumefied and pitted on pressure, and the patient's features were so much disfigured that he was not at all recognizable.

I gave him a free purge, and zinc. sulph. ℥j in aqua Oiss to sponge his face with every hour during the day and a few times through the night. In two days I found my patient walking about the house, and "feeling quite well." The œdema about his eyes had nearly disappeared, and desquamation of the epidermis from his face was proceeding in the usual manner.

The foregoing cases, with others, could be related more fully did I think the detailed histories of the cases called for.

REVIEWS.

ART. XVII.—*A Practical Treatise on the Surgical Diseases of the Genito-Urinary Organs, including Syphilis. Designed as a Manual for Students and Practitioners. With Engravings and Cases.* By W. H. VAN BUREN, A.M., M.D., Professor of the Principles of Surgery, with Diseases of the Genito-Urinary System and Clinical Surgery, in Bellevue Hospital Medical College, etc., and E. L. KEYES, A.M., M.D., Professor of Dermatology in Bellevue Hospital Medical College, etc. 8vo. pp. xvi., 672. New York: D. Appleton & Company, 1874.

THE high reputation of the authors of this volume, and the position which they claim for it in their preface, make it incumbent on the reviewer to examine the work with more than ordinary care, and to judge it by a higher standard than would be employed in dealing with the production of an obscurer writer, or with a book of less ambitious aim.

Referring to the tendency observed in all large communities for the practice of medicine to become subdivided into special departments, and to the facilities for clinical study afforded by large city hospitals, and the opportunities for teaching furnished by the establishment of medical schools, the authors add that cities are "the natural repositories of accumulating experience and the sources of advancing knowledge.

"It is from city practice and hospital experience, therefore," they go on to say, "that the materials for the preparation of text-books on special subjects would be naturally sought, and from these sources the substance of the present work has been mainly derived. Its object is to present to the student and general practitioner a succinct account of the nature and treatment of the diseases incident to the genito-urinary organs as they are encountered in private and hospital practice by those engaged in their daily and especial study. The literature of this department of surgery has been exhaustively studied with the purpose of reproducing every fact of practical value. It is hoped that the reader will recognize a conciseness in the grouping of these facts which will save him the necessity of reference to the numerous monographs and essays from which they have been collected."

It will thus be perceived that the authors professedly speak *ex cathedrâ;* they, as specialists, undertake to convey, in the volume before us, information which they have had special opportunities of acquiring, to their less-favoured brethren; and they not only communicate the results of their personal experience, but they claim, moreover, to have exhaustively studied the literature of their subject, and to have condensed in their work all that is worth knowing in regard to the diverse and intricate subjects of which they treat.

Before entering upon a detailed examination of their pages, let us say at once that, even when judged by the high standard which they themselves have set up, the authors' work impresses us as one of much merit, and as one which, upon the whole, satisfactorily fulfils its design. As a practical work it is, we think, particularly deserving of commendation; it covers more ground than any similar volume in our language with which we are acquainted, and its teachings upon almost all subjects are such as must be

approved by every judicious surgeon. Upon some few points we venture to think that the authors convey erroneous doctrine; but the very fact that upon these points such diverse views are entertained by equally competent authorities, shows that surgeons are still far from having acquired certainty upon these matters, and that with regard to disputed questions it is often safer to be undecided than dogmatical.

As to the encyclopediacal character claimed for the work, while we admit that the authors' reading has evidently been wide and profitable, we should hardly call it *exhaustive;* this epithet is, indeed, rather a large one, and in the present era of prolific authorship can seldom be applied with justice. In one respect the work is, we think, decidedly amenable to criticism; this is that the authors' excursions amid the *prata jucunda* of surgical literature seem to have begun and ended on the other side of the Atlantic: indeed the ingenuous student, or the inquiring general practitioner, who should rely exclusively upon Drs. Van Buren and Keyes's treatise, would inevitably infer that, apart from the authors, America had produced but a dozen or so surgeons living in New York, and a much smaller number sparsely planted over the rest of our wide country. We have no sympathy with that provincial spirit which regards American as better than European work, simply because it is American; but on the other hand we maintain that the work of our own countrymen is certainly no worse than that of foreigners, and that in a volume designed as a text-book for American students it should receive at least a share of attention. As an illustration of what has been said we may mention that among the hundreds of references in the foot-notes, including very many to English, French and German journals, we have been able to find but one to any article in the American Journal of the Medical Sciences, and that reference so indefinite that we cannot resist the suspicion that it has been taken at second-hand from Dr. Bumstead; but we know that this Journal has, during its forty-seven years of existence, contained papers, by writers in all parts of our country, which are of interest and value to students of genito-urinary surgery, and which, in our opinion at least, the authors might have advantageously consulted in the preparation of their work.

Leaving this subject we shall now invite attention to the general plan and execution of the book, and afterwards to such points as seem to us to call for special comment. The whole work is divided into two parts, the first treating of "Diseases of the Genito-Urinary Organs," and the second being devoted to the consideration of "Chancroid and Syphilis." The *first* part consists of twenty-eight chapters, and takes up successively Diseases of the Penis, Diseases of the Urethra (including Gonorrhœa and its complications, and Urethral Stricture), Diseases of the Prostate, Diseases of the Bladder, Vesical Calculus and its treatment by Lithotrity and Lithotomy, Diseases of the Ureter, Diseases of the Kidney, Diseases of the Scrotum, Diseases of the Testicle, Maladies involving the Genital Function, Diseases of the Cord, and Diseases of the Vas Deferens and Seminal Vesicle. The *second*, and shorter part, contains thirteen chapters, two of which are devoted to Chancroid, and the remainder to Syphilis; the chapter on Syphilitic Diseases of the Eye, as we learn from the preface, has been entirely furnished by Dr. H. D. Noyes, and the authors acknowledge their indebtedness to Dr. Roosa for aid in the preparation of the chapter on Syphilitic Diseases of the Ear.

In Chapter I. are described the various affections met with in the penis, excluding those which involve the urethra. Wounds, contusions, and

so-called fractures of the penis are briefly considered, as are the various forms of tumour met with in this organ, and diseases of the prepuce and glans, including phimosis, paraphimosis, balanitis, vegetations, etc. In the account of the operation of circumcision, nothing is said about the use of fenestrated forceps for the preliminary introduction of sutures, and the instrument figured in the accompanying illustration is unfenestrated, though dubbed with Ricord's name; but the peculiarity of Ricord's instrument, according to Guérin and other systematic writers, consisted precisely in its being fenestrated instead of plain; it is but right to add that Ricord is said by Guérin to have subsequently abandoned the use of the suture altogether in this operation in favour of the serre-fine.

Chapter II. opens with an account of the anatomy of the urethra, and a description of the operation of catheterization. The proper curve for urethral instruments was carefully studied many years ago by Dr. Van Buren, by means of ingeniously planned experiments carried out in conjunction with the late Dr. Isaacs, and was ascertained to be the same as that recommended by Sir Henry Thompson, in his well-known work on stricture, and which is now commonly spoken of as the "Thompson curve." Deformities of the urethra, including hypospadias and epispadias, are briefly described, and in connection with the former, Bouisson's operation for incurvation of the penis is referred to; but no mention is made of the ingenious modes of treatment advocated respectively by Mr. Holmes, of London, and by Prof. Pancoast, of this city. Two pages are devoted in this chapter to the subject of "*Urethral and Sexual Hygiene*," and frequent references to the same occur in various parts of the book; the author's views upon these delicate topics seem to us eminently just and practical, and their instructions upon these points might be profitably studied by all medical men. In one particular they seem to us, however, to have gone rather too far, and that is in the freedom, not to say looseness, with which they have prescribed wedlock for all forms of sexual discomfort; apart from the moral side of the question, and the fact that the happiness of the innocent bride should be at least as much considered as that of the repenting sinner who proposes to seek health in matrimony; we greatly doubt whether marriage entered into simply as a means of cure, often proves efficient in conferring the benefits which are sought from it.

In speaking of *contusions of the urethra* (ruptured urethra), the authors say:—

"If the patient can pass water, and there is no infiltration of urine, no attempt should be made to introduce an instrument into the bladder immediately after contusion of the urethra, for fear of making a false passage at the injured point of the canal."

This we believe to be unsafe teaching; with care, a flexible catheter can almost always be passed in these cases, and the patient is, we think, much less exposed to the risk of urinary extravasation if a catheter is promptly introduced and kept in, than if he is permitted to attempt to pass water without the aid of an instrument. Failing to pass a catheter, the surgeon should, we think, at once lay open the urethra from the perineum. Upon this subject our readers may advantageously consult an interesting case reported by Dr. T. F. Betton in the number of this Journal for February 1837, p. 389, with an appendix by the editor, giving the details of a number of cases of a similar character.

A few pages are devoted in this chapter to the curious affection known as *Urethral or Urinary Fever*, and the subject is again adverted to in

one of the chapters on Lithotrity. The authors do not seem to us to have thrown any new light upon the pathology of this disease, and, while recognizing in some cases a septicæmic or pyæmic condition, and in others one of uræmia, fall back upon our old friends "shock and reflex action," as being the cause of the symptoms in most instances. We have so often in these pages discussed the pathology of urethral fever and its congener gonorrhœal rheumatism, and given our reasons for believing that both are closely analogous to, if not actually mild forms of, pyæmia, that we need not revert to the question at this time, further than to say that the terms "vague suspicion" (p. 81), "vague opinions" (p. 321), and "vague ideas" (p. 322), by which the authors characterize the views of those who think as we do, seem to us much more applicable to the doctrines of "shock and reflex action" (pp. 46, 47), and "idiosyncrasy" (p. 81), which they themselves advance. We cannot but admire the *naïveté* with which Dr. Keyes tells in a foot-note (p. 46) how he has experimentally practised hypodermic injections of *urine* in the unsuspecting patients of the Charity Hospital—an observation *in corpore vili* with which he is so much pleased that he narrates it over again on page 144, adding that the patients ingenuously supposed that they were receiving injections of morphia.

This chapter ends with an account of *Foreign Bodies in the Urethra*, for the removal of which, when long and soft (as a bit of catheter or stick), a little operation is recommended which we do not remember to have seen previously described, and which is certainly ingenious and worthy of trial; this consists in transfixing the foreign body with a stout needle passed through the floor of the urethra, and pushing back the canal as far as possible, like a glove over a finger, then withdrawing the needle and transfixing again, and so gradually coaxing the foreign body forwards until it can be seized at the meatus.

Chapter III. is devoted to a consideration of *Gonorrhœa*, which the authors in common with most modern writers describe as being simply a virulent *urethritis*, though they think it desirable for practical purposes to retain both names, and to apply the latter to all cases of doubtful origin. In the treatment of gonorrhœa the authors attribute more value to internal medication than we are disposed to do, and particularly to the administration of copaiba, oil of yellow sandal-wood, and cubebs; although, as our readers know, we follow Abernethy in approving of the "constitutional treatment of local diseases," we have never been able to see the propriety of systematically burdening the alimentary canal with these nauseous remedies in seeking a cure for an affection of the urethra, which can in most instances be so conveniently and so satisfactorily treated by topical means alone. No allusion whatever is made to the use of copaiba by urethral injection, a mode of treatment which we believe originated with Dallas, of Odessa, and which, though no doubt valueless, appears at first sight sufficiently plausible, one would have thought, to have merited mention, even in the way of warning, in such an exhaustive work as this professes to be. In speaking of *deep urethral injections*, the instruments devised by Bumstead and Bigelow are referred to and figured, but no allusion is made to the equally ingenious appliances of Morgan, of Dublin, Durham, of London, and Hewson, of Philadelphia.

In Chapter IV. are considered the complications of gonorrhœa, including gonorrhœal rheumatism, and the two forms of gonorrhœal ophthalmia—the rheumatic and the conjunctival. *Epididymitis*, one of the most troublesome complications of gonorrhœa, is considered in another

part of the book in connection with diseases of the testicle. In the treatment of gonorrhœal conjunctivitis, or (as we prefer to call it) ophthalmic gonorrhœa, the authors advise free, and, if necessary, repeated division of the external canthus, so as to relieve the eye from pressure; and, in the early stage, if the patient be robust, repeated abstraction of blood by leeches or cups, together with irritant purgatives and low diet. We confess that this plan of treatment seems to us rather heroic; we are disposed to think that in a majority of cases the free administration of quinia will prove more truly antiphlogistic than the repeated application of cups. As regards local treatment, the authors justly lay stress upon the importance of cauterization and the enforcement of cleanliness.

Stricture of the Urethra forms the subject of the next four chapters; and this is, upon the whole, one of the most satisfactory portions of the book. The various instruments needed in the management of stricture, and the proper mode of employing each, are carefully described, and no one can read these pages without perceiving that in this department of surgery the authors speak by the card, and teach out of the full knowledge of a large experience. Here we find much to praise and little to criticize. We cannot, indeed, share the authors' preference for metallic over flexible instruments in the treatment of stricture, and are somewhat surprised at their statement that "patients tested, at the same sitting, with soft and steel instruments, almost invariably complain less of the latter;" for our own observation has led us to form a different conclusion. It is but right to add, however, that Drs. Van Buren and Keyes only recommend steel instruments of a size not less than No. 9 of what they call the "American scale," *i. e.*, five millimetres, or about one-fifth of an inch in diameter. The modes of treatment commended by the authors are simple dilatation, rupture, or divulsion, and internal and external urethrotomy. The method of continuous dilatation is but slightingly referred to, which we think an error, for we regard it as the next best method to simple dilatation; and, though Arnott's use of fluid pressure is mentioned, no reference is made to the more recent and ingenious mode of employing the same agent advocated by Coze, of Strasbourg; nor to the use of laminaria bougies, as practised by Reeves and Newman. Yet these are modes of treatment the merits or demerits of which should, we think, have been pointed out in a text-book written by specialists upon the subject of their specialty. It could not be expected, perhaps, that all the urethrotomes and divulsors which the ingenuity of surgeons has suggested, should be described; and, indeed, the authors profess to give an account only of "the type instruments of each class." Yet room, we think, might have been advantageously made for a notice of the excellent splitting instrument devised by Richardson, of Dublin; and we should like to see an authoritative condemnation of a certain urethrotome which is found in our cutlers' shops under the name of a learned Professor of Philadelphia. Again, we think some notice should have been taken of the ingenious modifications in the operation of external urethrotomy suggested respectively by Jordan, of Birmingham, and by Mastin, of Mobile; and, in connection with the operations of puncturing the bladder through the rectum and above the pubes, some account should have been given of Brander's method of puncturing through the symphysis, and of Cock's recently revived mode of "tapping the urethra at the apex of the prostate." Still these are, after all, comparatively unimportant defects; and we should not, perhaps, have thought it worth while to notice them but for the authors' assertion that they had exhausted the literature of their subject.

We have been particularly struck by the extent to which the authors push the maxim "*Festina lente*" in the treatment of stricture by simple dilatation. They lay it down as a rule in these cases,

"That it is bad surgery . . . . to reintroduce an instrument—unless it be filiform—before the lapse of at least seventy-two hours, and that more rapid progress will be made with the case by waiting till after ninety-six hours—often even until the sixth, seventh, or eighth day;" and that, "in brief, intervals of a week, especially in cases of old stricture, are generally more beneficial than any shorter period."

They also direct that, when an instrument has reached the bladder, it should be at once gently withdrawn, and believe that nothing is gained by leaving it even for a moment.

In a foot-note to the section on *External Perineal Urethrotomy, with a Guide*, Dr. Van Buren gives a plain, and, so far as we can judge, a perfectly candid and apparently truthful account of the introduction of what are commonly known as tunnelled urethral instruments—an account which those of our readers who also read the *New York Medical Record* will hardly need to be told differs in essential particulars from that which has been somewhat industriously circulated by a former assistant of Dr. Van Buren, who has thought proper to claim the invention as his own. We have no desire to take any part in this controversy, but feel that it is due to Dr. Van Buren to say that, judging from all the evidence on the subject which has been brought to our notice, we see no reason to doubt that the merit of the original suggestion of tunnelled instruments, be it great or small, is due to him, and to him alone.

We cannot do better, in terminating our examination of this part of the volume, than to quote the authors' "*Summary of Treatment of Stricture.*"

"1. Alkalies, diluents, and rest, are serviceable in most cases of stricture; sometimes indispensable if there be any serious complication.

"2. All uncomplicated strictures, not highly irritable or resilient, should be treated by dilatation with soft instruments up to No. 9, conical steel sounds afterwards; reintroductions being made every fourth to eighth day—the older the stricture the longer the interval as a rule, and intervals of one week being most serviceable in the majority of cases.

"3. All strictures at or near the meatus must be cut.

"4. Resilient, very irritable, and, as a rule, traumatic strictures are best treated by divulsion if they lie below four and one-half inches from the meatus, otherwise by internal urethrotomy. When a resilient stricture cannot be divulsed, it should be cut—internally.

"5. Impassable stricture may usually be overcome—where there is no restriction—by time, patience, and skill, with whalebone bougies. If finally proved impassable, the treatment is external perineal urethrotomy.

"6. Retention is treated by hot baths, ether, opium, tincture of the sesquichloride of iron; failing these, by puncture above the pubis with the aspirator or through the rectum to gain time; or by external perineal urethrotomy without a guide.

"7. For stricture complicated by abscess, infiltration, or many and large fistulæ, and for extensive traumatic stricture, external perineal urethrotomy.

"8. For infiltration, free incisions, stimulants, supportives, with thorough external division of the stricture.

"9. For fistula with loss of substance, local cauterization, lace suture, or plastic operation. Where there is no loss of substance, complete dilatation of the stricture is soon followed by closure of the fistula."

Chapters IX. to XI., inclusive, are devoted to *Diseases of the Prostate*, and furnish an excellent account of the various affections to which this

small but sometimes troublesome organ is subject. In referring to Thompson's anatomical investigations as to the frequency of enlarged prostate in old persons, no reference is made to Dr. Messer's more extended series of dissections (though Sir Henry Thompson himself refers to them with proper acknowledgment), nor to the similar but even more extended investigations made respectively by Professor Dittel, of Vienna, and by Dr. J. W. Lodge, of Philadelphia. To the two forms of "bar at the neck of the bladder," ordinarily recognized by surgical writers, Drs. Van Buren and Keyes add a third, which they describe as "centric median hypertrophy, where a transverse bar of hypertrophied tissue is formed, instead of the usual oval tumour." We confess that we see no advantage in separating this from the more common form of median hypertrophy which constitutes the so-called "third lobe of the prostate." The pages devoted to the treatment of enlarged prostate are eminently judicious and practical. We should like, however, to find some expression of opinion as to the plans which have been from time to time suggested as modes of *curative* as distinguished from *palliative* treatment—such as the use of pressure, originally employed by Physick, the various crushing and tearing operations still in vogue amongst French surgeons, and the interstitial injection of tincture of iodine recommended by Heine.

The section on *Cancer of the Prostate* does not impress us as favourably as those which precede it. Tanchou's statistics are quoted, but Thompson's exposition of their fallacy is not referred to, and no notice is taken of the very elaborate memoir on prostatic cancer recently published by Jolly.

Chapters XII. and XIII. are occupied with an account of various *Diseases of the Bladder*. A short account is given of the condition known as extroversion or exstrophy—the authors persist in spelling it *extrophy*[1]—of this organ, but no mention is made of the ingenious operations suggested or practised, with the hope of effecting a radical cure in cases of this affection, by Simon, Lloyd, Athol Johnstone, Holmes, and Sydney Jones. The less ambitious, but more satisfactory mode of treatment by plastic operation, is briefly referred to, but its history is carried no further than the year 1865; had the authors been familiar with one or two papers which have appeared in this Journal during the last few years, they might, we think, have made this section of their work both more interesting and more valuable than it is.

Wounds and ruptures of the bladder, the presence of foreign bodies in this organ, and retention and incontinence of urine are successively considered, but the remarks upon these several subjects call for no special comment. An interesting section is devoted to chorea of the bladder, a rare affection, of which the authors give three illustrative cases, and which they have found amenable to hygienic and general tonic treatment. Three pages are given to the subject of hæmaturia, but no reference is made to Mr. Hilton's interesting lectures upon the aid afforded by examination of the coagula in ascertaining the source of the hemorrhage in these cases. The twelfth chapter terminates with an account of the affection known as neuralgia of the neck of the bladder, for which the authors recommend their favourite remedy—matrimony—with the occasional introduction of a conical steel sound.

[1] It is rather odd that writers who think it necessary to explain that "lithic acid" comes "from the Greek λίθος, a stone" (p. 259), should not have taken the trouble to look up the derivation of exstrophy, when they would, of course, have found its origin to be from στρέφω, *I turn*, and not from τρέφω, *I nourish*.

In Chapter XIII. are considered the important subjects of *Cystitis*, acute and chronic, *Pericystitis*, *Atony*, and *Paralysis of the Bladder*, and various rarer affections, such as tuberculosis and cancerous disease of this organ, and the development of fibrous, cystic, and villous growths. Battey's and Powell's operations of cystotomy for chronic cystitis are mentioned, but no reference is made to Guthrie as the original suggester of this mode of treatment, nor to the early operation of Willard Parker, nor to the more recent instances of its employment, in the female, in the hands of Sims, Bozeman, and Emmet. For simple atony of the bladder the authors recommended injections of cold water, beginning at a temperature of 90° F. and running down as low as 40°.

Chapter XIV., on *Stone in the Bladder*, contains a great deal of valuable information, conveyed in a plain and practical manner, and may be studied with advantage by every practitioner of surgery. In a foot-note to page 272, Dr. Van Buren gives an interesting account of "the first case of lithotomy with anæsthesia." We could wish that all surgeons were impressed with, and would practically act upon, the truth conveyed in the following sentence—a truth which applies as well to other capital operations as to lithotomy:—

> "The simple fact that an operation can be done is no reason why it should be done in the face of very serious risk to life; and it is hardly necessary to say that the temptation to perform a capital operation, even at his urgent request, should never weigh for a moment against the best interests of the patient who places his life in our hands."

Some surgeons, however, seem to consider it a point of honour, in every case to do *something*, even if that something should but serve as a "happy despatch" to hurry their patient with redoubled velocity out of the world.

Lithotrity forms the subject of Chapters XV. to XVII. inclusive. The first suggestion of this mode of treating stone is, as usual, attributed to Gruithuisen (or, as his name is here spelled, Gruithausen), but no reference is made to the claim of priority which has been advanced, and, so far as we know, never disproved, on behalf of the Italian surgeons, Santorio and Ciucci. Sir Henry Thompson's statistics are quoted, but the authors seem to be familiar only with his report of 184 cases in the 53d volume of the *Medico-Chirurgical Transactions*, and not with his more recent and more elaborate report of 204 cases in the second edition of his *Practical Lithotomy and Lithotrity*. In speaking of the means employed to assist the evacuation of fragments after lithotrity in cases of atonied bladder, Clover's apparatus is described, but no allusion is made to the ingenious siphon arrangement, employed by Prof. Dittel, of Vienna. In this portion of their volume the authors recur to the subject of urethral or urinary fever; we venture to think that a study of Dr. Dickinson's admirable paper "On disseminated Suppuration of the Kidney," in the last volume (56th) of the *Medico-Chirurgical Transactions*,[1] would render them less emphatic in their denunciation of the "vague opinions" of those who are disposed to look upon this affection as a form of pyæmia.

Chapter XVIII. is devoted to the subject of *Lithotomy*. The authors do not seem to be quite clear as to the relative positions to be assigned to this operation and lithotrity. On page 280 they tell us that the latter "has taken position, not as a rival of lithotomy, but as a new and additional resource, etc.;" but on page 328 they say that lithotomy "is an operation of far less importance than its powerful rival lithotrity;" while

[1] See also No. of this Journal for July, 1873, p. 251.

on page 329 they again change their tone, and declare that "lithotomy still holds its place as one of the grandest operations of surgery, and still has no rival in at least fifty per cent. of all cases of stone, taken collectively, at all ages."

The lateral, median, and supra-pubic, are the only forms of operation described by the authors; this we think an error in judgment, for in a special text-book, such as they have undertaken to furnish, the student reasonably expects to find an account of every mode of proceeding which is not obsolete, and which is advocated by respectable authority. Even were the medio-lateral (Buchanan's), the medio-bilateral, and the prerectal operations omitted, at least the ordinary bilateral and recto-vesical operations should have received some attention. The directions given as to the manner of performing the various operations are usually clear and comprehensive, such, indeed, as would be expected from writers who are known as both skilful surgeons and practised teachers. As a matter of personal preference, we are disposed to consider fenestrated forceps, lined with linen, as more generally useful than the heavy bladed forceps which alone are described by the authors, and we think the direction given that the right side of the prostate should be invariably divided whenever the stone is more than one inch in diameter, unnecessarily sweeping, for we feel sure that stones of this size, or even somewhat larger, may, ordinarily, be removed with perfect safety by the single left-sided section. Speaking of the treatment of deep-seated hemorrhage, after the operation of lateral lithotomy, the authors recommend the tying in of a tenaculum, and describe and figure Keith's instrument (with removable handle), but do not mention the name of Physick, as having eighty years ago successfully resorted to this mode of treatment; nor do they make any allusion to the well-known forceps subsequently devised by the same surgeon for the application of a ligature in these cases. Prof. Gross's "artery compressor" is referred to, but no notice is taken of John Bell's advice to secure the bleeding vessel "by laying hold of it with the old artery-forceps and letting them remain for the night."

Chapters XIX. and XX. are devoted respectively to *Diseases of the Ureters* and *Diseases of the Kidney*. Chapter XIX. occupies less than a page, and though rupture of the ureter is alluded to, no notice is taken of the late Mr. Poland's valuable paper on the subject. Chapter XX. is upon the whole well done, but we doubt the wisdom of undertaking the description of what are generally recognized as *medical* affections in a *surgical* text-book; almost all the subjects discussed in this chapter may be found as well if not better treated of in works on practical medicine, and the space which they here occupy might we think have been more profitably occupied with other matters. In the section on *peri-nephritic abscess*, Dr. Bowditch's paper read in 1868 before the Boston Society for Medical Observation, is quoted, but the authors do not seem to have met with Dr. B.'s more recent and much more elaborate memoir published in the Report of the Boston City Hospital, for 1870, while Trousseau's investigations upon the same subject are not even alluded to. *Nephrotomy* for renal calculus is more favourably regarded by the authors than by most surgical writers, and more so, we think, than is justified by recorded experience. The famous case of the archer, quoted by Paré from Monstrelet, which Drs. Van Buren and Keyes seem to look upon as authentic, may, we think, since Velpeau's *tranchant* criticism of it, be dismissed as apocryphal; while of the four cases which have been recorded since Mr. T.

Smith urged the revival of the operation,[1] two terminated fatally, and in the other two no stone was found. Hence, Marchetti's case remains as the only one in which the operation has hitherto proved successful. Half a page is given to *ablation of the kidney*, and Dr. Peters's paper is erroneously referred to as containing "a report of the only cases (three in number) where a similar operation had been performed previous to his own." A reference to the number of this Journal for January, 1873 (p. 278), will show that the number of cases on record is considerably larger than that given by Dr. Peters.

Chapter XXI. is devoted to *Diseases of the Scrotum*. A paragraph is given to the affection known as elephantiasis of this organ, but though it is stated that, in operations for removal of the hypertrophied scrotum, "patients are apt to die on the table, from hemorrhage, which is always excessive," no reference is made to the ingenious plans suggested for the prevention of this accident by O'Ferrall, Fayrer, and other surgeons.

Diseases of the Testicle form the subject of the next four chapters, which upon the whole afford a very satisfactory exposition of the important matters upon which they treat. This review, however, has already extended to such length that we must refrain from examining them with as much minuteness as they deserve. From expressions used on pp. 402 *et seq.*, we infer that the authors hold the view that the cure of hydrocele is invariably effected by the adhesion of the opposing surfaces, and consequent obliteration of the cavity, of the tunica vaginalis; such indeed we believe to be usually the fact, but several cases which have fallen under our own observation have led us to think that Mr. Erichsen is right in declaring that, in some instances at least, obliteration of the cavity is not necessary. We do not approve of the authors' recommendation that, in the treatment by iodine injection, a large quantity of fluid should be thrown in and subsequently withdrawn; we believe, with the late Mr. Syme, that a much surer method is to inject a small quantity of the undiluted tincture (not exceeding three fluidrachms), and to allow it to remain. Epididymitis is well described in this portion of the volume, in connection with orchitis proper (from traumatic causes, etc.), but no reference is made to what we consider the best mode of treatment, viz., puncture of the tunica albuginea, as originally suggested by Petit,[2] and more recently practised on a large scale by Vidal (de Cassis) and H. Smith. Puncture of the tunica vaginalis is alluded to, but this is a different, and, as we venture to think, a less efficient remedy. The section on tuberculous disease of the testicle is a very good one, but might we think have been still further improved by referring to Salleron's elaborate memoir upon this subject.

Chapter XXVI. is devoted to a consideration of *Maladies Involving the Genital Function*, and is, in our judgment, one of the best, if not the very best, in the whole volume. The delicate questions treated of in this chapter are discussed with modesty, and at the same time in a perfectly practical manner, and the authors' views seem to us decidedly more consonant with reason than those maintained by Mr. Acton in his well-known work *On the Functions and Disorders of the Reproductive Organs*.

Diseases of the Cord (including varicocele) are described in Chapter XXVII., and *Diseases of the Vas Deferens and Seminal Vesicles* in Chap-

[1] The modern literature of nephrotomy is not alluded to by the authors.

[2] Not PETIT *le Grand*, but a less famous surgeon who wrote in the early part of the present century.

ter XXVIII. We quite agree with the authors that varicocele, in the large majority of cases, requires merely palliative if any treatment; but we cannot subscribe to the doctrine which they advance that, when more radical measures are needed, "in the vast majority of cases but one operation is allowable, namely cutting off the redundant scrotum." On the contrary, we regard this as more severe than almost any other of the various modes of treatment which have been suggested, and as certainly more so than that of Mr. Henry Lee, which seems to us as little open to objection as any operation of the kind can be.

We have already consumed so much of our allotted space, in noticing the first part of Drs. Van Buren and Keyes's treatise, that we must greatly abbreviate what we should like to say about the second portion, that which treats of Chancroid and Syphilis. This we regret the less, however, because the views which they advance correspond in most respects with those which we have so often maintained in the pages of this Journal, and because there is little indeed in this part of the work to call for criticism.

One or two points, however, we cannot let pass unnoticed. We have already had occasion to comment upon Dr. Keyes's zeal for experimental study upon the bodies of his hospital patients, but we find in a foot-note to page 478 an observation which throws his hypodermic use of urine quite into the shade.

"It has been stated," he tells us, "that chancroid will not take upon a patient suffering at the time from acute febrile disease. To test this point, Dr. Fiset, at the Charity Hospital, at my suggestion undertook some experiments. They were, unfortunately, interrupted after the doctor had inoculated one patient three times upon the thigh, the gentleman in charge of the fever wards being fearful lest syphilis[1] should be introduced among his patients. . . . . Two of the punctures took perfectly, although the process of ulceration was very slow. On the thirteenth day, pus from one of these ulcers was inoculated upon a healthy patient, with the effect of producing a characteristic chancroid. The ulcers on the leg of the typhoid patient finally became confounded in a single ulceration two inches in diameter, which was dressed with iodoform, and on the patient's discharge from the hospital, convalescing, after a sojourn of fifty-three days, the ulcer was reduced to a diameter of one inch, and was healing."

But on page 484 the authors declare (and truly) that

"During the whole period of its existence the chancroid furnishes auto-inoculable pus. The old theory, that after repair was well advanced the secretion ceased to be poisonous, is no longer tenable."

Hence this unfortunate fever patient was not only himself endowed with a disease from which he was free when he entered the hospital, but was sent out with a large, unhealed chancroid, ready to contaminate any unwary person with whom he might happen to come in contact. *In Cave periculum* may be all very well, but when a chancroid is bestowed for the benefit of science upon an unsuspecting charity patient, he should at least be cured again before he is let loose upon the public.

On page 504, the authors give instructions for the opening of buboes, but neglect to say in what *direction* the incision should be made; this we consider a matter of some importance, believing that the healing process is more quickly accomplished when the incision is made to correspond with the long axis of the patient's body, than when, as is often done, it is made in a line parallel to Poupart's ligament. In the authors' remarks upon

[1] This gentleman could not, apparently, have been sound on the question of the *duality* of venereal sores.—REVIEWER.

the transmission of syphilis by inoculation of secretions, we find no reference to the early observations of Dr. Hammond, nor to those more recently published by Mr. Morgan and Mr. H. Lee. While we quite agree with Drs. Van Buren and Keyes that the initial lesion of syphilis is always a chancre, and that there is no condition to which the name of syphilitic gonorrhœa can with any propriety be applied, we think that the testimony now before the profession renders it unsafe to deny that, as *secondary* lesions, contagious urethral and vaginal discharges may occur in cases in which no ulcerations or abrasions can be detected.

In the *treatment* of syphilis, the authors recommend the use of mercury during the primary stage, in this differing from Dr. Bumstead and others, who postpone specific treatment until the manifestation of secondary phenomena; again the authors recommend that the mercurial course should be continued from six to eighteen months after the disease is apparently cured, while Bumstead suspends treatment within a few weeks after the cessation of all appreciable symptoms. For our own part we see no objection to the cautious use of mercury during the first stage of the disease, and believe that, though its employment may not prevent the occurrence of secondary symptoms, it at least renders them milder; when, however, the secondary stage has been safely gone through with, and the patient is restored to health, we see no advantage in further persistence in treatment, particularly as it is by no means certain that tertiary symptoms will occur in every case, and as, on the other hand, it is very doubtful whether the use of mercury under these circumstances actually exercises any prophylactic influence.

A few words must be said before concluding as to the qualities of the book, as a literary production. In spite of occasional but probably unavoidable repetitions, the authors' arrangement of their matter is convenient, and their style generally clear, concise, and elegant; we have, indeed, noted one or two odd words or expressions, such as *gouts* of mucopus, *pilimiction*, and "the diagnosis is *with*," instead of "the diagnosis is *from*;" moreover, we cannot appreciate that purism which leads the authors invariably to substitute "kidney-stone" for "renal calculus," while at the same time they try to naturalize such detestable barbarisms as "Cowperitis," "peri-cowperitis," and "phimosed." The numerous references in the foot-notes give an air of erudition to the pages of the book, but are in many instances of but doubtful utility; it is bad enough to be referred, as is frequently done, to a single large volume in a foreign language, without any indication of edition, date, or page; but how bald and valueless are such citations as "Guy's Hospital Reports" (p. 318), "Dublin Medical Press" (p. 94), and "Philosophical Transactions" (p. 370). As for the reference to Humphrey's paper on page 346, it is hardly necessary to say that the *Trans. Prov. Med. Assoc.*, for which Humphrey wrote, were the Transactions of the *Provincial*, and not of the *Providence* Medical Association.

The publishers' share in the production of the volume is deserving of all praise. The paper is good, and the printing neat and more than ordinarily accurate, while the illustrations, though not numerous, are usually appropriate and well executed.

In terminating this review we beg to say again that we look upon Drs. Van Buren and Keyes's Treatise as a very valuable contribution to surgical literature. Considering the wide range of the subjects which it embraces —covering, as it does, the same ground as the several works of Sir Henry Thompson, Mr. Curling, Mr. Acton, and Dr. Bumstead—it must be

looked upon as a model of judicious condensation, while at the same time every chapter shows that its authors have not derived their materials from books alone, but from the fertile field of a wide practical experience. If in the preceding pages we have seemed to deal more in criticism than in commendation, it is because the merits of the work are so obvious that he who runs may read; and because we have deemed it necessary to justify the charge which we felt compelled to make at the beginning, that the authors' research into the literature of their subject had been less exhaustive than they seemed disposed to believe. Should these lines fall under the authors' observation, we would venture to express the hope that in a second edition (which we feel sure will ere long be demanded) they will either make the book more exclusively didactic—imparting, as none have a better right to do, their own opinions only, with all the authority to which they are entitled—or else that they will spare no pains to make it in fact, as in design, a complete exposition of the existing state of genito-urinary surgery in all parts of the world. In the latter case we hope moreover that the work will possess, more than it does at present, an *American* character. The book is already such a good one that it would be a great pity if, for want of a little labour, it should not in future editions approach still nearer to perfection. J. A., JR.

ART. XVIII.—*A Manual of Toxicology, including the consideration of the Nature, Properties, Effects, and Means of Detection of Poisons, more especially in their Medico-legal Relations.* By JOHN J. REESE, M.D., Professor of Medical Jurisprudence and Toxicology in the University of Pennsylvania, etc. 8vo. pp. 507. Philadelphia: J. B. Lippincott & Co., 1874.

TOXICOLOGY is a subject apt to be slurred or even not taught at all in our medical schools, and thus it comes to be the branch of medicine about which the average practitioner knows least. He has at his tongue's end the duration of a fever, the date when to expect secondary symptoms following a chancre, or the pathology of pneumonia; but if suddenly put on the witness-stand and asked how soon after taking arsenic the metal can be found in the liver; how long after death prussic acid can be detected in a body; or what are the lesions in phosphorus poisoning, he is pretty sure to cut a sorry figure; while of chemical analysis he generally knows nothing. Even in the practical matter of the therapeutics of poisoning, we see a suggestive indication of professional ignorance in the full directions for treating such cases commonly provided so carefully in physicians' diaries to the exclusion of the more usual catalogues of eclipses and tables of postage-rates. Dr. Reese's book should, therefore, be sure of a welcome on our tables, presenting, as it does, the practical essentials of toxicology in a compact and accessible form. The work may be divided, for the purposes of the reviewer, into two parts; the first being the chapters dealing with the general considerations of the science, and the second those occupied with the detailed account of individual poisons.

Dr. Reese begins with a carefully worded definition of a poison, and in view of the keenness of cross-examinations in the witness-box, it is well to have our ideas on this subject accurate.

"A POISON may be defined to be *a substance capable of producing noxious and even fatal effects on the system, no matter by what avenue it be introduced; and this, as an ordinary result, in a healthy state of the body, and not by a mechanical action.*" p. 14.

In this definition the question of *quantity* of the poison required to produce the noxious or fatal effect is very properly not considered, since anything that practically can be introduced into the system in fatal or noxious amount, however large such amount must absolutely be, is plainly as much a poison as one whose fatal dose may be but a fraction of a grain.

Chapters II. and III. are occupied with the general physiological questions involved in the action of poisons, and are similar to the chapters on the same topics that preface the text-books on materia medica; embracing the consideration of local and remote action, absorption, elimination, circumstances modifying action, etc. In connection with the subject of absorption there is an important toxicological point so certain to come up in medico-legal cases, and so apt to be carelessly misconceived, that our author very wisely lays great stress on it in several places. It is simply that in fatal poisoning by agents that act only after absorption, it is not what is found in the *stomach* that caused death, but what, before death, had passed *out* of the stomach *into* the blood and thence to the organs and tissues. Strange to say, it is not uncommon to hear physicians wisely declare that unless a fatal dose of a poison can be actually found in a dead man's stomach, there is no reason to assume that death was from that cause. And on the witness-stand the expert is almost sure to be asked if he found "enough of the poison in the stomach to have caused death." The fallacy is self-evident upon a moment's thought. Considering the disposition of poisons after absorption, Dr. Reese says:—

"After the poison has entered the circulation, it may either be rapidly eliminated by the different emunctories, especially by the kidney, or it may be temporarily deposited in the organs and tissues of the body, and usually in the following order as to quantity: the liver, spleen, kidneys, heart, lungs, brain, and pancreas. Experiment has shown that only a minute quantity of the poison is circulating in the blood *at any one time;* the effort of the system evidently being to get rid of it as rapidly as possible. Moreover, there is good reason to believe that the poison is active *only while circulating in the capillary bloodvessels:* while still in the stomach, or after separation from the blood by the emunctories, or when deposited in the solid tissues, it is believed to be entirely harmless." p. 26; the italics are the author's.

To much of this we must demur. In the first place, elimination and temporary deposition in the organs and tissues are given as the only "dispositions" of a poison after it has gained entry to the blood. Surely it must be by inadvertence that a third important disposition is omitted mention, namely, chemical transformation while in the system; an effect which with many organic substances, as alcohol, morphia, etc., may even amount to permanent destruction of a great bulk of the poison as such. To the statement that there is, generally speaking, an evident effort of the system to rid itself of a poison as rapidly as possible, we cannot subscribe. Such is, we know, the common idea, and from what is thus assumed to take place in artificial poisoning, the analogous belief is held that many diseases are but attempts of "nature" to do the same thing with the subtle poisons unwittingly received from the marsh or the cess-pool. The question is one of great interest and importance, as the assumption of a natural eliminative tendency is sure to affect our treatment both of poisoning and disease. We believe it, however, to be a fallacy, and that careful analysis

of facts shows nothing looking like an intelligent endeavour of "nature" to cast out peccant substances, but that innocent and noxious agents alike are dealt with in the system strictly according to their physical and chemical properties, regardless of consequences to the health of the system at large. Elimination, chemical decomposition, or temporary fixing in the tissues thus follow blindly in accordance with general chemico-physiological laws. To suppose otherwise, is to assume the existence in each living body of a quasi-intelligent principle capable of knowingly setting up vital processes for an ulterior purpose in the interests of the general health. Such an assumption would be a revival of the old "Archæus," and is wholly opposed to facts. Take the case of alcohol: even in poisonous dose the elimination is now known to be trifling, and no more than must occur with any substance present in the blood in large quantity. The vast bulk of the alcohol is gradually dealt with strictly according to its chemical nature of an easily oxidized hydrocarbon, and, strange to say, the tissues that hold the poison unchanged the longest, and are the last to yield their absorbed portion to the venom-destroying process of oxidation, are the very nervous tissues themselves, which are the most poisoned of all by the substance in question. So that here, instead of an effort of nature to rid herself of a poison by elimination or otherwise, we have a veritable picture of her hugging the deadly asp most desperately to her bosom. But the matter is too vast to be discussed here, and we must refer the reader to the interesting papers of Dr. Anstie on the subject, by which the present remarks were suggested.[1]

Dr. Reese's statement that "there is good reason to believe that poisons are active only while circulating in the capillary bloodvessels," surely cannot be meant to bear strict interpretation. If a poison act only while in the blood, it must logically produce its effect only by modifying either the blood or the circulation. That many do so act is of course true, but equally true is it, in all human probability, that others act, in part at least, by direct impression of the tissues; an action that must take place, of course, after the poison has got *out* of the blood and *into* the tissues. Is there any reason for not supposing that much of the profound nervous disturbance caused by ether, chloroform, or alcohol, is by actual soakage of the nerve-substance with these highly diffusible substances, instead of being purely a secondary consequence of an altered blood or blood-supply? Indeed Dr. Reese seems to think so himself, as in speaking again of the *modus operandi* of poisons, he says:—

"Liebig's theory (at least with respect to the action of the poisonous alkaloids) was that they entered into chemical combination with the nerve-substance; morphia, with brain-substance, for instance; and thus the quality of the nervous matter being altered, it became unfitted to support life. Another theory is that poisons act by destroying the vitality of the blood. But as is justly remarked by Prof. Taylor, this destruction of the vital properties of the blood does not explain the specific differences of poisons, seeing that they do not act all alike.

"As regards any actual alteration *in the blood itself*,—either chemical or physical,—nothing has been yet satisfactorily demonstrated, except occasional changes in its colour, consistence, and coagulability. Microscopic observation has failed to show any alteration in the appearance of the blood-corpuscles that can be regarded as conclusive." p. 33.

Chapter IV. is short, but important, dealing with the question of the *post-mortem* imbibition of poisons, which is thus put:—

[1] The Practitioner, vol. viii. pp. 161, 356, and vol. ix. p. 84.

"Is it possible for a dead body to imbibe a poisonous substance from the soil in which it has been interred? and is it possible that a poison introduced into the stomach or the rectum, or by the hypodermic method, after death, should pass through the tissues by imbibition into other viscera of the body, so as to give rise to the suspicion of poisoning, when in reality the death had resulted from a different cause?" p. 38.

Practically the first proposition concerns only arsenic, and it is shown by clear reasoning and by direct experiment that as a matter of fact impregnation from arsenical soil does not occur. As regards the second question, a *partial post-mortem* imbibition of a poisonous substance from the stomach to contiguous parts may undoubtedly take place, but in such case a diagnostic circumstance would be the inevitable finding of the substance in greatest quantity in the parts immediately adjoining the site of introduction, and in the outer rather than inner portion of organs so impregnated. In this connection the effects of a possible *post-mortem introduction* of a poison are discussed, and diagnostic rules given.

Chapter V. deals with the medico-legal bearing of the various evidences of poisoning, including rules and warnings to the expert how to make his examinations as free as possible from every *conceivable* source of error. And to one who has never followed a case through the courts such rules are most timely; for nothing is more likely to happen to the beginner than the utter spoiling of what may be morally sure evidence by the careless failure to weld some one little link in the chain of rigid legal requirements. In his analysis of the weight of the different kinds of evidence our author is exceedingly cautious, and we heartily commend his conclusions, especially to the glibly-swearing class of medical witnesses. Thus, on the one hand, neither symptoms, *post-mortem* appearances, nor even finding of a poison somewhere in the body, can, *taken singly*, make out, with complete certainty, a death by poisoning; while, on the other hand, the non-production of the characteristic symptoms, lesions, or even the failure to find any of the poison in the body, does not necessarily in all cases break down the prosecution. We especially commend the following statement, with which we entirely concur: "no medico-legal case of poisoning can possibly be established by symptoms alone, for the reason that there are no *characteristic* symptoms of any single poison." p. 46.

Chapter VI. treats of "compound poisoning" and the possibility of the symptoms of a poison being masked or its effects modified by the simultaneous giving of another. In this connection Dr. Reese briefly gives the results of his own experiments to determine the compound effect of the more commonly used poisons.

Chapter VII. gives in detail the systematic method of chemical procedure to be pursued in a case of suspected poisoning, and Chapter VIII. reviews briefly the medico-legal questions connected with poisoning, as developed in the foregoing portion of the book.

Chapter IX. is on the *Duties and Privileges of Medical Experts*, and its subject matter is one with which every medical man should be familiar, as there is no one in the profession who may not be called upon to testify as an expert. Dr. Reese bewails—as who does not?—the wretched system by which any ignoramus, under the garb of "doctor" or "professor," may be foisted upon a court as an "expert," when his only qualifications may be that for three years he spent some of his spare time on the back benches of a medical college-amphitheatre, or that he once washed bottles in some chemist's laboratory. We confess we never could see why questions of science affecting the issue in a trial were not exactly analogous

to questions of law similarly involved, and why therefore they should not be dealt with in the same way. If a disputed point be about a matter of physiology, as whether a man died from a half dozen bullet-holes through his intestines or from morphia, the jury, themselves utterly ignorant of the subject, are allowed to decide any way they please, after listening, for guidance, to an indefinite number of irresponsible opinions from "experts," all tacitly assumed of equal weight, because forsooth the diplomas of the witnesses are all of equal length and breadth of sheepskin. But let the disputed point be one of *law*, a subject of which the jury is also ignorant, and the procedure is very different. An officer called a *judge*, designed to be selected for proven capacity and experience, is appointed to give the jury *his* decision in the matter, and by that they must abide; while to provide against his mistakes there are other, higher tribunals of similarly appointed experts, to whom an aggrieved party may appeal. Why not let questions of law be settled like those of physiology? Thus when a legal point arises in course of a trial, let counsel summon any curb-stone "attorney and counsellor-at-law," who after interviewing is found to hold the desired opinion, and, calling him a legal "expert," parade his professional lucubrations as conclusive of the knotty point. Then, after hearing a dozen such witnesses on each side, let the jury settle the matter to suit themselves, and the prisoner go hang on the wisdom of their decision. In Germany, it seems, a very different system prevails. Dr. Reese says:—

"In Germany it is, fortunately, otherwise. In criminal cases, the experts first summoned are exclusively those whom the State, after proper examination of their competency and skill in such particular inquiries, has duly authorized to act for this purpose; while in addition to this, there is organized a tribunal of experts, to which the opinions of expert witnesses can be referred." p. 12*.

A question quite important for a medical man to know is "whether an 'expert' witness is obliged to obey the process of a subpœna, like any ordinary witness, and testify in a given case *as to his opinion*, without a previous guarantee of an adequate pecuniary compensation." p. 123. Dr. Reese tells us that the law can compel any one to appear before any court in his own state, on service of a subpœna, though there are dissentient opinions of lawyers and judges on record as regards obliging a person to testify to a scientific opinion merely. We have always thought the law forcing the attendance of an expert as much a violation of personal liberty as would be one compelling a lawyer to accept an appointment to the bench, whether he would or not, but that is neither here nor there. In the matter of securing *pay* for professional services rendered to the state or the defence, we heartily agree with our author that the expert has the moral right to ample compensation, and should look to securing it with a sharp business eye, as experience shows a strong likelihood of his being outrageously cheated if he doesn't.

Chapter X. begins the systematic part of the work, and considers the classification of poisons. Here Dr. Reese very properly adopts the physiological instead of the naturo-historical basis of classification. No one who has not been kept awake at night by trying his own hand at it, knows the insurmountable obstacles in the way of classifying, by their action, medicines or poisons; and none such, therefore, will find fault with our author for saying that his arrangement "is, to a great extent, an arbitrary one, and necessarily imperfect." It is as follows:—

Table of Classification.

CLASS I. Irritants.	Order 1. Irritants proper.	Mineral.	Non-metallic. / Metallic.
	Order 2. Irritants producing remote specific effects.	Vegetable.	
		Animal.	
CLASS II. Neurotics.	Order 1. Cerebral.	Narcotics.	
		Anæsthetics.	
	Order 2. Spinal, or Tetanics.		
	Order 3. Cerebro-spinal.	Deliriants.	
		Depressants.	
		Asthenics.	(p. 134.)

The remaining chapters, which, of course, make up the bulk of the volume, are devoted to the detailed account of individual poisons. The plan followed is to give for each the essentials of its natural history, the symptoms of poisoning, fatal dose and period, therapeutics, lesions, and chemical analysis. We shall not attempt to follow the author through all these details; and, in a book of this character, which deals far more with well-ascertained facts than with opinions, there is really but little matter for an extended review. In general, the topics are treated of in a purely practical manner, the volume being a working handbook for the toxicologist; and as the latter is most concerned with the chemical detection of poisons, this branch of the subject is the one most fully presented, and is, indeed, very thoroughly done. In his symptomatology we do not think our author is so happy. Many of the descriptions are very meagre, and consisting merely of a bald enumeration of the functions disturbed, fail to present a vivid picture of the condition of the sufferer. Neither is the natural *sequence* of the symptoms always properly indicated, nor care taken to point out the usual from the exceptional effects. As an illustration, take the following account of belladonna-poisoning:—

"The symptoms are as follows: A sense of heat, and extreme dryness of the mouth and throat, with difficulty of swallowing, nausea, vomiting, giddiness, impaired vision, a flushed face, sparkling eyes, delirium of an excited maniacal character, spectral illusions, convulsions, followed by stupor and coma. The pupils are extremely dilated, and insensible to light. Cases have been reported where the pupils were contracted during sleep, but dilated in the waking state. Irritation of the urinary organs is not uncommon, such as strangury, suppression of urine, and hæmaturia. A scarlet eruption on the skin, resembling that of scarlatina, is frequently observed. The *delirium* is of a peculiar character. The illusions are sometimes pleasing, exciting violent laughter; at other times they produce furious actions. There is loss of consciousness. The symptoms generally manifest themselves within one or two hours after swallowing the poison; but in poisoning from the berries they may be delayed for several hours. In cases of recovery the symptoms are sometimes very long in disappearing.

"The following case is quoted from the *New York Journal of Medicine*, vol. viii. p. 284: 'A man ate a pie made with the berries of belladonna and apples. A few minutes afterwards he complained of feeling drowsy; the lethargy soon increased; his countenance changed colour; the pupils became dilated, and he experienced a coppery taste in the mouth. On going up stairs he staggered, and, upon entering the room, he fell, and became insensible. He subsequently became delirious and convulsed, and died the following morning. A child, to whom a portion of the pie had been given, died on the same day.'

"The following instance of recovery is related by Dr. Gray (*N. Y. Journ. of Med.*, Sept. 1845, p. 182): A child between three and four years of age swallowed from eight to twelve grains of the extract of belladonna. About half an hour afterwards the expression of the patient was that of terror; the pupils were widely dilated, and immovable; the conjunctiva highly injected, and the whole eye prominent and very brilliant. The face, upper extremities, and trunk of the body exhibited a diffused scarlet appearance, studded with numerous papillæ, like the rash of scarlatina. The skin was hot and dry; pulse

increased in force and frequency; respiration anxious and stridulous. There was a constant but unsuccessful attempt at deglutition, with spasmodic action of the muscles of the throat and pharynx; and paroxysms of violent motion, with rapid, automatic movements, attended with convulsive laughter. Under the action of an emetic the alarming symptoms passed off in about three hours, and the child recovered, with the exception of a moderate diarrhœa, and a slight enlargement of the pupil." pp. 436–38.

Here the only real *description* of belladonna-poisoning is the narration of the second individual case. In the general account, where we naturally look for a systematic analysis of the effects of the poison, we have only a list of symptoms put together without order, and with no clue as to which are the more characteristic—which, that is, we should find even in slight poisoning, and which, on the other hand, only occur in severe or fatal cases. Vomiting and convulsions—unusual effects—are put in the same category with dilatation of the pupil and dryness of the throat and mouth—affections perfectly certain to occur if the system be at all poisoned; while the earliest, and one of the most characteristic symptoms, acceleration of the pulse, is not mentioned at all. And, on the whole, we think the reader will agree with us, that one who had never seen a case of belladonna-poisoning could hardly form, from the foregoing description, a clear mental picture of the rise and progress of the symptoms, of the condition of the sufferer at any one stage of the poisoning, or of how he would be affected by different amounts of the drug.

The following is the account of chronic iodine-poisoning:—

"In chronic poisoning (*iodism*) produced by the prolonged employment of iodine in medicinal doses, or by its external application, the symptoms are vomiting and purging, tremors, palpitation, pain in the stomach, cramps, salivation, general emaciation, and gradual absorption of certain glands of the body, particularly the mammæ of females, and the testes of males: there is usually an increase of most of the secretions, and enlargement and tenderness of the liver. All of these symptoms are not generally present in every case of iodism, but they have been produced by small doses administered for a few days at a time." p. 210.

Here the very unusual effect—if, indeed, it occur at all—of atrophy of the breasts or testicles, is given among the more ordinary symptoms without a word of comment upon its rarity; and if we strike this out, the remainder of the description, so far as it goes, would apply almost as well to the poisoning by mercury as to that by iodine.

In speaking of poisoning by putrescent food, Dr. Reese surprises us by the following statement:—

"It is well known that the putrid animal matter of the dissecting-room, entering the blood through an abrasion of the skin, causes the most alarming symptoms, which often terminate fatally. There is extensive local inflammation of the veins and absorbents, together with diffusive cellular inflammation, and great constitutional fever of a low character." p. 359.

Here one would be led to infer that a dissection-wound almost inevitably produces grave or even fatal poisoning; whereas, as every medical student knows, such effects are exceedingly rare. Neither, in the ordinary sense of the word, is *putrid* animal matter the most virulent; poisoning being more apt to occur in autopsies on freshly dead bodies, than where decomposition has actually begun.

We make these various comments not in any carping spirit, but to furnish the reader with some vouchers for our opinion that the descriptions of poisoning in this otherwise good book will bear some revision and improvement.

But little attempt is made to analyze the nature of the physiological action of the "neurotic" poisons, an omission which, while saving many long and fruitless discussions, yet often deprives the student of the key to the understanding of the symptoms.

The sections on therapeutics are brief, but the latest discoveries in the line of treatment of poisonings are carefully given. We note one or two omissions—perhaps intentional—as the practical value of the antidotes is not yet clinically established. Such are Bamberger's copper antidote to phosphorus, the ethyl and methyl compounds of strychnia as antidotes to strychnia itself, and the use of hypodermic injections of atropia in hydrocyanic acid poisoning. One naturally turns to find what so careful an author says about the physiological antagonism of morphia and atropia; and considering the vast importance of the subject, from the frequency of opium-poisoning, we confess to a little disappointment at the fruits of our search. Dr. Reese is content to waive an analysis of the question, and merely state generally that "atropia is now generally regarded as a true physiological antidote to opium" ..... "we cannot withhold our conviction that they are antidotal to each other in man." pp. 370, 371. Of course, we cannot discuss this much vexed question here, but we must say that since Dr. Reese's book is so likely to become a text-book for the beginner, we think he should have gone somewhat more into detail here, and have shown the reader just in what the antagonism would appear to consist. As it is, one who did not know might readily gather the vague and false idea that these two most complex-acting substances produce effects that in all respects nullify each other. In practice Dr. Reese directs in opium-poisoning that atropia "be carefully administered in successive doses until the pupils begin to dilate, and the breathing becomes increased in frequency" (p. 371); and in stramonium-poisoning that morphia, hypodermically, "be persevered in until its effects are manifested by the contraction of the pupils." (p. 446.) Our own opinion is, that the effect on the pupils is a bad, and even dangerous guide by which to regulate the use and dose of either alkaloid, especially in the case of morphia against atropia, and we cannot but regard the directions in stramonium-poisoning, just quoted, as highly unsafe.

As we have already said, the chemical part of the work is that to which the author has given most space. Here his directions are very full and explicit, and furnish an excellent practical guide to the toxicologist. The subject of spectrum-analysis is not treated of at all. In making this announcement in the preface Dr. Reese says:—

"The subject of *spectrum-analysis* has not been treated of in the present volume. This truly beautiful method of analytical research has developed the most wonderful results both in chemistry and in other departments of science. In point of delicacy, it far transcends the most subtle and refined chemical reactions; and, as a corroborative means of evidence, it will doubtless prove of great value to the toxicologist. But as it deals, so to speak, with infinitesimals, we do not think it would be safe, in a case of alleged poisoning, to rest the evidence solely upon the spectral demonstration of the supposed toxic agent, to the exclusion of the recognized *chemical* tests. When an accumulated experience with spectral analysis has rendered the identification of the various poisons absolutely and *exclusively* certain, we can probably afford to abandon altogether the more tedious and complex methods of chemical research." p. ix.

Considering how careful Dr. Reese has been to confine himself to practical matters, the omission of the subject of spectrum-analysis is not at variance with the general scheme of the work. E. C.

ART. XIX.—*A Treatise on Therapeutics, comprising Materia Medica and Toxicology, with especial reference to the application of the physiological action of drugs to clinical medicine.* By H. C. WOOD, Jr., M.D., Professor of Botany and Clinical Lecturer on Diseases of the Nervous System in the Medical Department of the University of Pennsylvania, etc. 8vo. pp. 578. Philadelphia: J. B. Lippincott & Co., 1874.

THE progress of medicine, from the blind guessing of empiricism towards the goal, still far distant but not undiscernible, of scientific certainty, can nowhere be traced with greater ease or interest than in the treatises on materia medica and therapeutics which have appeared, with their offers of healing for the nations, in countless numbers, from the time that Nechepsus, six hundred and thirty years before Christ, wrote that "a green jasper, cut into the form of a dragon surrounded with rays, if applied externally, would strengthen the stomach and organs of digestion," to the appearance of the treatise before us. The materia medica of Galen, in which, according to his celebrated hypothesis, the properties of all medicines are stated to depend upon their four *cardinal* qualities, heat, cold, moisture, and dryness, and in which medicines are advised for the treatment of diseases in proportion as the latter are hot, cold, moist, or dry, reflected the speculative character of the therapeutics of his age. The materia medica of Paracelsus, with its extraordinary doctrine of signatures, was an apt illustration and natural outgrowth of mediæval medicine. Nicholas Culpeper's Physicians' Library, with its prefaratory "Astrologo-Physical Discourse of the Humane Virtues in the Body of Man," and its description of the "roots, herbs, seeds, living creatures, stones, tears, barks, fruits, spirits, physical wines, excrements, oyls, oyntments, minerals, plasters," etc., mirrored the absurd conceits and strange hypotheses of the therapeutics of the seventeenth century. Jonathan Pereira's Elements of Materia Medica and Therapeutics, a magnificent monument of human industry and learning, indicate perhaps more vividly than any other work the great advance which the medicine of the first part of the nineteenth century made over its predecessors, but they also show how little scientific accuracy there was in the application of drugs to the treatment of disease during the same period. Dr. H. C. Wood's Treatise on Therapeutics, Materia Medica, and Toxicology (which has just appeared), indicates the physiological direction that recent therapeutical study has taken, and fairly presents the acquisitions that therapeutics has made in following out its chosen path.

Dr. Wood's Treatise is a handsome, large octavo volume, of five hundred and seventy-eight pages, dedicated to his uncle, the venerable Dr. George B. Wood, whose name is so honourably associated with American medicine. It is, as stated by the author in his preface, an attempt to present to the medical profession

"A book into which should be gathered the many scattered facts in regard to the physiological action of medicine—a book in which an attempt should be made to sift the true from the false, to reconcile seeming differences, to point out what we know and what we do not know, and to give a platform from which investigators might start forward without the necessity of being, as is so often the case, ignorant of what was already achieved, or of spending a great deal of time in a wild hunt through the almost boundless, but often scattered and inaccessible ranges of Continental literature."

The book commences with a brief introduction, in which pharmacy, the

United States Pharmacopœia, modes of administering drugs, influences that modify the action of remedies, and rules for doses are referred to, and a classification of the materia medica presented. The latter, which Dr. Wood properly styles only "a convenient row of pegs upon which to hang our ideas and facts," is substantially a physiological one. By it, remedies are arranged in three large divisions: *First*, general remedies, such as astringents, tonics, cardiac stimulants, etc.; *second*, local remedies, such as emetics, cathartics, diuretics, etc.; and *third*, substances which act externally to the body, as antacids, anthelmintics, etc. The names of some of the classes of these divisions are themselves hints of the new direction that the study of the materia medica has taken. Analgesics, mydriatics, anæsthetics, depresso-motors, oxytocics, and digestants would have been unintelligible terms to Culpeper, and possibly some of them to the philosophic Donald Monro. The chief part of the book is, of course, devoted to a description and discussion of the various agents of our present materia medica. It should be mentioned that drugs alone are included in this description. Climate, occupation, exercise, mind, electricity, food are only incidentally referred to by Dr. Wood, not described as remedial agents.

It adds to the value of the work, that it is not encumbered with needless learning. Very little is said about the history of the drugs that are described. Students who desire to learn the pedigree and biography of the drugs they use, or to be informed concerning the various transformations that drugs have undergone from the time of Æsculapius till now, will find little to satisfy them in the treatise that is before us. In like manner, very little is said about the botanical characteristics or chemical properties of drugs. The reader is properly permitted to gather this sort of information from professed works on botany and chemistry. And so with regard to pharmacy, the importance of pharmaceutical manipulations is recognized, but they are not described. This plan, which excludes the history, botany, chemistry, and pharmacy of the materia medica from discussion and consequently brings the reader directly without preface to a study of the physiological action of each drug, is one of the best features of Dr. Wood's book. The medical student and pactitioner desire to get at the preparations they are to employ at the bedside as directly as they can, and to be introduced with the least possible ceremony to their physiological action and therapeutical use. This course Dr. Wood has steadily pursued.

Another excellent feature of the book is the space that is allotted to describing the physiological action of drugs. Too little attention has been paid, hitherto, to this fundamental part of the materia medica. Eleven pages, for example, are given to an analysis of the physiological action of the sulphate of quinia, and less than half that number of pages to an account of its therapeutical application. The latter is a corollary from the former, and can be stated in a few words, if the physiological is well made out and clearly stated. All the important drugs, such as opium, belladonna, digitalis, alcohol, aconite, etc., are discussed in a similar way, that is, first physiologically and then therapeutically.

It would be impossible or difficult to estimate accurately the amount of labour that observers in Europe and this country have spent during the last twenty or twenty-five years in their efforts to solve the problem of the physiological force of drugs and to ascertain the mechanism of their therapeutical action. Physiologists have endeavoured to trace with absolute certainty the time and rate and mode of the entrance of drugs into, and diffusion

through, and departure from the organism; and to learn the exact phenomena that attend every step and stage of the process of drugs from the moment of entrance to the last moment of elimination, transformation, or destruction. The record of all this work is to be found chiefly in the medical journals of Europe and America, and in the various monographs upon drugs that have appeared on both sides of the Atlantic within the last quarter of a century, and especially within the last two decades. We know of no book in the English language which has collected so thoroughly the best work in this direction of the last twenty years and arranged it so well. While it is not exhaustive in this way, it contains the best that has been done and leaves out very little of value. The *Practical Therapeutics* of Dr. Edward John Waring, which was republished in this country seven of eight years ago, we have hitherto regarded as the best treatise of the sort accessible to the English reader, but the physiological portion of Dr Wood's work is much fuller and more complete than that of his transatlantic colleague. Those who are familiar with German medicine will be reminded by the book before us of Nothnagel's recent treatise rather than of any English or American writer on materia medica.

It is not to be expected in a treatise of this sort that all portions of it would be of equal excellence. Some parts must necessarily be fuller and more exact than others. Such is the case with the work before us. Notwithstanding this, it may be justly said of it that while none of its articles are poor, some of them are not only good, but are admirable illustrations of physiological and therapeutical description. The articles on Belladonna, Digitalis, Aconite, Alcohol, Opium, and Indian Hemp may be mentioned in confirmation of this remark. They give in clear and distinct language excellent accounts of what has been ascertained up to the present time with regard to the physiological action and therapeutical use of these drugs. Our author's statement of the comparative value as anæsthetics of sulphuric ether and chloroform presents the anæsthetic merits and demerits of these two agents with judicial fairness. It deserves attention on both sides of the Atlantic. With regard to the first, he says:—

"As an anæsthetic, ether does not act with the rapidity and pleasantness of chloroform, but it has the advantage of safety. So dangerous is chloroform, and so safe is ether, that there is no excuse for the use of the former agent under ordinary circumstances. The reason of the safety of ether is that, unlike chloroform, it never suddenly paralyzes the heart. It may kill by inducing asphyxia, but it does so slowly, and in the great majority of cases after warnings which can be overlooked only through the most reckless carelessness." p. 245.

With regard to chloroform, he remarks:—

"As an anæsthetic chloroform possesses the advantages of quickness and pleasantness of operation, smallness of dose, and cheapness. These advantages are, however, so outbalanced by the dangers which attend its use, that its employment under ordinary circumstances is unjustifiable. It kills without warning, so suddenly that no forethought, or skill, or care can guard against the fatal result. It kills the robust, the weak, the well, the diseased alike, and the previous safe passage through one or more inhalations is no guarantee against its lethal action. Statistics seem to indicate a mortality of about one in three thousand inhalations, and hundreds of utterly unnecessary deaths have now been produced by the extraordinary persistence in its use by a portion of the profession. It ought, therefore, never to be employed except under especial circumstances, as in some cases of *puerperal eclampsia*, when a speedy action

is desired, or in the field during war-time, when the bulkier anæsthetics cannot be transported." p. 251.

The solution of the problem of the proper use of alcoholic liquids must and will be finally made by the physiologist and physician, and it is the duty of the medical profession to enlighten the public upon this grave matter of therapeutics, morals, and sanitary science to the extent of their knowledge and ability. Dr. Wood's statement of the value and use of alcohol is not less important to the reformer than to the physician, and few physiologists will be found to deny its correctness.

"From what has been said," he remarks, "it is certainly deducible that alcohol in small amount is an *arterial* and *cerebral stimulant*, increasing functional activity in the nervous and circulatory apparatus; is a *food*, in the sense that it is destroyed in the system, and there performs a physiological office; is, when in sufficient quantity, a retarder of tissue changes, because it lowers animal heat independently of any action on the nervous system, and also probably checks the excretion of carbonic acid and of nitrogen. . . . . If alcohol be oxidized in the body, and be a food, as it seems to me is clearly proven, it must of course generate force, measurable by the modern standard of the heat-unit. A little calculation will show the importance, or rather the great amount, of the generated force. According to Dupré one gramme of alcohol oxidized in the body evolves 7184 units of heat, whilst the same weight of lean beef gives off only 1482 units of heat. It has been estimated that 9.3 ounces of lean beef, equal to about two ounces of alcohol, will supply the necessary force to maintain the circulation and respiration of an average man for one day. That is, four ounces of strong spirit will suffice for this purpose. Since, to the ability of furnishing material whose consumption shall give power is added the ability to restrict waste and to stimulate the functions of circulation and of the nervous system, it is evident that in alcohol we have a most important means of sustaining the system during the strain of an acute exhausting disease." p. 109.

The therapeutic deductions which follow from these actions of alcohol on the human system are obvious, and need not be quoted; and it should be added that the moral and sanitary deductions are not less obvious nor less important than the therapeutic ones. When those who advocate the daily use of spirits, wines, etc. are wise enough to recognize the tremendous evils that alcohol inflicts, and those who advocate its prohibition and extermination are wise and broad enough to recognize the good it is capable of doing and has done, we may hope for a better public sentiment upon the vexed question of alcohol, and for wiser legislation with regard to it.

During our reading of Dr. Wood's treatise we had marked several other articles than those we have mentioned for comment and some for criticism and dissent, but the length which this notice has attained forbids any allusion to them. It only remains for us to refer the reader to the book itself, with the assurance that he will find it a most valuable addition to his medical library. It is a sort of work on materia medica and therapeutics that has been long needed both by the practitioner and student, and we congratulate the author upon his success in carrying out a most difficult undertaking. Only those who have worked among the tangled heaps of wheat and weeds that encumber the therapeutics even of the last half century, and tried to sift the grain from the chaff, can appreciate the difficulty of producing a work like the one before us.

We ought not to forget to add, in conclusion, that the typographical execution of the volume is excellent, and creditable to the house that issued it.

E. H. C.

ART. XX.—*The Principles and Practice of Medical Jurisprudence.* By ALFRED SWAINE TAYLOR, M.D., F.R.S., Lecturer on Medical Jurisprudence in Guy's Hospital. Second edition. 2 vols. 8vo., pp. xvi., 723, xii., 672. Philadelphia: Henry C. Lea, 1873.

THE author of these volumes has been so long and favourably known as an authority on the subjects of which they treat that we gladly welcome them as representatives of his matured experience. Dr. Taylor is best known to American readers by his Manual, which has passed through many editions under the care of no less than three editors in this country, yet we cannot but regard with pleasure the fact that there should be sufficient demand for the larger work to justify its importation at this time, hoping that it may be an omen of a diminishing taste for bare abstracts, and of an increasing relish for comprehensive treatises, as thorough scientific acquirements are but little advanced by manuals, which enable us to know a little of everything, and have a smattering of many branches of knowledge. We propose to draw attention to some points in this work which have interested us, and which have a bearing upon the duties of general practitioners, without attempting to present an epitome of volumes so exhaustive in their character.

We are met at the outset by the subject of medical evidence, than which none more disturbs the mind of the physician when called to the witness stand, or more excites his interest as a mere scientist, anxious for the progress of legal medicine. It is also one which is justly regarded by the public as of much importance, and yet one which, from the laxity of rules which govern it, or want of system observed in their application, bids fair to be eventually viewed by the community with unmixed and merited contempt. Dr. Taylor devotes two chapters to the subject, discussing it with sufficient fulness and precision; his conclusions being especially worthy of consideration, coming, as they do, from one whose experience in the English courts has been so varied and extensive. He speaks of medical men appearing as simple witnesses of facts which have occurred in the course of their ordinary business; as medical experts, either in obscure cases where, the interpretation of the facts being disputed, their especial skill, founded upon experience, is expected to shed light upon the legal puzzle; or in the somewhat invidious position of medical counsel. Of ordinary medical witnesses it is sufficient to say that their testimony is subject to the ordinary rules of evidence, and will necessarily partake of the character of those who give it, and that they will best provide for their own comfort, and further the ends of justice, who aim only at telling the truth, testifying that they have seen with as small an admixture of mere theory or personal opinions as practicable, remembering that the more observant and accurate a man is the more valuable will his testimony be. When we consider the position of medical experts, however, the question is very different, and beset with difficulties. In this country and England, either prosecution or defence is at liberty to call any doctor, and dub him expert for the occasion, without much reference to his previous record or special fitness. As a consequence, the whole local profession, if necessary, is submitted to a process of filtration until some one is found who holds the views required by the exigencies of the attorneys. By such means diametrically conflicting testimony is surely obtained, and the administration of justice is dis-

graced by vindictive and even personal contests between the so-called experts. To apply a remedy to this state of things is difficult in a country where the centralization of the government is not sufficient to permit of the adoption of the excellent system in force in some of the German States. In Prussia all disputed medico-legal questions are submitted to a governmental medical bureau, which is so arranged that each judicial district has its legal surgeon, physician, and chemist. Should an appeal be made to a higher court there is a correspondingly higher medical tribunal, before which the case comes, and from the highest there is no appeal. These officers receive very moderate salaries, and occupy the responsible position of judges of medical facts, being presumed to be beyond corruption or interest. In view of the difficulties which would be likely to attend the attempt to introduce so decided a reform, Dr. Taylor proposes that the judge before whom a disputed medico-legal case comes should have the power and responsibility of appointing the expert; or that either side, should they be unable to unite upon one, should each select one, who together might agree upon a third, as in an ordinary arbitration, who might decide any questions submitted to them by the judge, and, as assessors, give a proper estimate of the value of the medical testimony.

Chapter III. treats of questions concerning the dead body, and gives the signs of death, enumerating as such, cessation of respiration and circulation, cooling of the body, and cadaveric rigidity. Under the last-mentioned head will be found much of physiological interest. The investigations of Brown-Séquard are detailed, and his conclusions given as follows: The greater the degree of muscular irritability remaining at the time of death, the later cadaveric rigidity sets in, and the longer it lasts. It would also appear from the observations of the same gentleman that the later putrefaction begins, the more slowly it progresses. After showing that muscular spasm may pass into *post-mortem* rigor, and narrating some old, though interesting cases, Dr. Taylor goes on to speak of the reality of death, carefully sifting the statements which have been made about premature interment. While he justly criticizes those authors who have made this subject so great a bugbear, stigmatizing them as terrorists, he yet thinks it would be well to pass a law prohibiting the burial of a body without the certificate of a physician who has seen it at least twenty-four hours after the time of apparent death, and such a measure he thinks would be much more satisfactory than attempting to provide the ignorant public with some so-called infallible sign by which to decide the fact of death. A recent case, and one which is apparently veritable, is given on page 77, which we here transcribe with Dr. Taylor's comments:—

"Near Morlaix, in France, a woman died, as it was supposed, from cholera. She was seen while ill by a medical man, but not after the supposed death. She was placed in a coffin in an hour, and buried in sixteen hours. During the interment a noise was heard in the coffin. Time was lost in sending for a medical man, and the coffin was not opened until he arrived. The shroud was found twisted and folded about the neck and feet, as if struggles had been made, and there was a quantity of liquid on it, which had issued from the mouth and nostrils during efforts made to breathe. The body was warm, and not rigid; there was a general relaxation of the muscles; the hand was translucent to light, and the pulsations of the heart had not completely ceased! Efforts were made to resuscitate the person, but without success. These conditions are consistent with death from cholera, with the exception of the last. If the medical officer was correct in his observation, this person had really been buried alive."

Devergie's report upon the above will be found in *Ann. d'Hyg.*, 1870, 2, 310.

Dr. Taylor directs attention to the differences which exist between superficial extravasations produced by violence during life, and the mere hypostatic staining which occurs after death, yet he does not follow the example of many other writers, who restrict the term ecchymosis to the former variety, and use the word suggillation when speaking of the latter condition, by which all possibility of confusion in the use of the terms is removed. As a consequence, all through the book we meet with ecchymoses, which could be demonstrated to be such by the extravasations revealed upon incision, and ecchymoses in which no effused blood can be found, and which must therefore be regarded as mere *post-mortem* stains.

Putrefactive changes are considered in a chapter of great interest and value. It is always curious to trace the source of old fables; especially is this the case when, as in the text, we find an instance where the fable is shown to have been based upon scientific facts. Observations upon the dead body have shown that, at a certain stage of natural decay, the blood becomes again fluid, being easily extruded from any external wound by pressure; and here we have, in Dr. Taylor's opinion, that which will account for the well-known superstition of the middle ages, that contact with the hand of the assassin would cause the wounds of the victim to bleed afresh. The almost equally old story, that quicklime will hasten the progress of putrescence, receives at the hands of Dr. Taylor a *coup de grace*, as he well shows that, so far from hastening decomposition, lime rather exerts a conservative influence upon animal tissues.

Changes taking place in the bodies of those drowned are discussed at some length. The difficulty of establishing any fixed rule as a criterion to determine the time of death is well shown, though it is admitted to be quite practicable, and very important to study and apply the general rules laid down by Casper and Devergie. But slight detailed reference is, however, made to Casper's experience, which was most extensive, and his conclusions the most exact with which we are acquainted. Either Dr. Taylor's personal experience in this matter has been slight, or it is a subject in which he feels little interest, for he only refers to the single fact that the uterus is among the last of the soft organs to undergo decay. We think it well to give here a synopsis of Casper's table, in which is recorded the results of his own observations, which is published in his own work, and transferred therefrom into most works on legal medicine, the accuracy of which can hardly be questioned. The order in which the soft organs undergo putrefactive change is: 1, trachea; 2, brain of young children; 3, stomach; 4, intestines; 5, spleen; 6, omentum and mesentery; 7, liver; 8, adult brain; 9, heart; 10, lungs; 11, kidneys; 12, urinary bladder; 13, gullet; 14, pancreas; 15, diaphragm; 16, large arteries; 17, uterus. The spleen sometimes precedes the stomach and bowels, while the lungs occasionally change places with the heart, but Casper claims, in the most emphatic manner, that the average will be in favour of the order given above.

Evidence to be derived from bones is dwelt upon at much length, poor Dr. Parkman's skeleton being represented as travelling across the page with much grace, in company with the mutilated remains found on Waterloo Bridge some years since, and which, by the way, were never recognized. Priority of death and survivorship also receive very particular notice, many curious cases being cited; but the points made, and the

decisions rendered, in most of them, will principally interest the legal profession; indeed, this chapter is chiefly valuable as showing what medical science, at present, cannot prove, and as affording illustrations of the value and weight of circumstantial evidence.

Passing over the subject of poisoning, which, though perhaps the most authoritative portion of these volumes, we think should form a separate treatise, or at least be reviewed from the standpoint of a toxicologist, rather than from that of a general practitioner, we come to wounds and personal injuries. The consideration of these subjects extends through numerous chapters, forming one of the grand divisions of the work.

Varying definitions of the term *wound* are given, and criticized in succession. Dr. Taylor justly declares his preference for that one in use upon the continent of Europe, which says "a wound includes any personal injury suddenly arising from any kind of violence applied externally, whether such injury is external or internal;" or, as still better, that which defines it as "a breach of continuity in the structures of the body whether external or internal, suddenly occasioned by mechanical violence." Though these may possess no especial value to surgeons, they are claimed to be of much service in a medico-legal sense, tending to simplify the practice of the courts. The whole subject is treated thoroughly and at length, with a good sprinkling of legal points and decisions, which our limits prevent even an examination of. On page 515 a case is cited where the chain of evidence proved deficient because the bullet which had caused death was too large for one pistol and too small for another. This case has caused us much perplexity; we have pondered over it—we have read and re-read it, and we remain in a maze—for while it is readily understood that a large bullet cannot come from a small bore, we can, despite all our efforts, see no obstacle in the way of a small ball being projected from a weapon of the largest calibre. We are forcibly reminded of the story told of Sir Isaac Newton, and think that we can enter into the feelings of his carpenter when told by the philosopher to make a big hole in the study door for the big cat, and a little hole for the little cat.

Spectrum analysis receives considerable attention, being regarded as a valuable aid in the investigation of doubtful stains—at least in the hands of one skilled in its application. Mr. Sorby thinks he has been able to detect so minute a quantity of the colouring matter of blood as the thousandth of a grain. Evidence to be derived from a microscopic examination of hæmatic crystals would also seem to possess value, though like that educed from the spectroscopic analysis, the basis of accurate observations upon which it rests is as yet too slender to give it much weight in a court of law. Of course, where the blood-corpuscles are not disintegrated, the microscope affords irrefragable proof, while the guaiacum test seems to have the most positive value where these bodies have been destroyed.

While the general consideration of wounds is very full, and many cases, together with the surgery involved in their treatment, are given at some length, we are surprised to find that wounds of the genitals are slurred over hastily, the paragraphs devoted to them being distinguished by unusual meagreness. The most striking recorded cases are not cited, so that any one who has occasion to consult Dr. Taylor's work upon this particular point will find but a poor reflection of the literature of the subject, which at best is not extensive.

Gunshot injuries, when small shot have been used, are treated of with minuteness, but while the experiments of M. Lachése are quoted to prove the distance at which fine shot will act as a single missile, no reference is made to the length of barrel, or size of bore of the weapon used, or the comparative proportions of powder and shot with which it was charged—factors which should enter largely into the question, and about which most information will be derived from books like those of Mr. Greener or Colonel Hawker. Indeed, in all such cases it would be better to call to the stand some practical sportsman or gunmaker, as much more likely to prove a skilled expert in such matters than the majority of physicians.

Burns are considered at length, Dr. Taylor thinking it necessary to give pretty full information upon the subject, even to the inclusion of the classical six degrees of Dupuytren. In Chapter LI. that fruitful resource of the writers of mysteries, the spontaneous combustion of the human body, is rightly shown to be without foundation in fact, and in total opposition to the truths of science, as no authentic case, where there was an absolute absence of a starting fire, is upon record. Immediately following is a very interesting account of the conditions under which the process does take place in substances used in the mechanical arts. That this, however, is a matter which should not come within the province of a medical expert, is well shown by the story told of M. Chevallier, whose opinion was required concerning the origin of a fire. While pondering the matter he noticed smoke issuing from a heap of cotton waste, and was informed by a workman from whom he inquired the cause of the phenomenon, that spontaneous ignition often occurred in masses of that material. Being thus furnished with information from one truly an expert in such matters, he was able to go into court and give a conclusive opinion.

Asphyxia, the third grand division of Dr. Taylor, is treated of under the heads of Drowning, Hanging, Strangulation, and Suffocation. All these subjects receive most thorough attention at the hands of our author, the cases narrated, both old and new, being numerous and valuable. The chapter upon hanging is illustrated by several wood-cuts, which show that, in order to produce a fatal result, it is by no means necessary for the body to be completely suspended. The difficulty of proving by the *post-mortem* appearances alone that death has resulted from simple asphyxia is fully demonstrated, and the sensible claim is made that in the attempt to reach a conclusion, the medical man should not be denied access to those details of circumstantial evidence by which alone, ofttimes, a decision can be attained. In drowning, however, the physical appearances are sufficiently decided to permit the formation of a positive opinion in the vast majority of cases. These appearances may be briefly stated to be: 1, engorgement of the venous system; 2, congestion of the lungs and infiltration of their substance with water; while, 3, the windpipe, bronchial, and minute air-tubes contain more or less froth. The above signs are almost constantly present, and when to them is added the presence of water or foreign substances in the stomach and air-passages, fulness of the right side of the heart, with other symptoms sometimes seen, there can be no doubt of the diagnosis.

Although deaths from irrespirable gases may be properly ranked with cases of poisoning, they are treated of in Chapter LVII., where, besides the legal aspect of such cases, will be found much that is valuable in a hygienic point of view. It is a noteworthy fact that the circumstance of a candle

continuing to burn, in opposition to the generally received opinion, does not afford proof that the surrounding atmosphere is sufficiently free from deleterious gases to be suitable for respiration.

Death from lightning, cold, heat, and starvation is considered in one chapter of eighteen pages. The first and last of these causes alone receive anything like just attention. From the fulness with which many surgical and medical points are given, which too often have no possible bearing upon the medico-legal view of the case, we confess to a feeling of surprise when we find the subject of the effects of cold comprised within three pages, while that of the effects of heat is compressed into less than one. Now, were these volumes merely the reflection of Dr. Taylor's own experience in Great Britain, we should not wonder at so decided an omission, but the work claims—and, for the most part, justly—the title of a treatise on the Principles and Practice of Medical Jurisprudence, and as such should show more fully the results obtained by those who have made these subjects matters of special study.

We pass next to Obstetric Jurisprudence. Pregnancy can come before the English courts in but one of two forms—where the asserted pregnancy of a widow affects the position of the otherwise legal heir—or where plea for a stay of execution on account of its existence is entered. The signs of its existence, in the living and dead, are given, but not with sufficient minuteness to render this portion of the book authoritative. The possibility of unconscious impregnation is admitted with quite enough freedom, but the cases quoted are few. Delivery occupies the next place. Great stress is laid upon the fact, that, in order to properly decide a question of recent delivery, much must depend upon the age of the uterine contents, and the difficulty will be in direct proportion to the length of time which has elapsed since the supposed delivery.

Abortion forms the subject of two chapters. The old distinction between emmenagogues, which stimulate the vessels of the womb, thereby promoting a menstrual flow, and ecbolics, which directly induce contraction of the uterine fibres, is revived, it being held that, while we have many drugs belonging to the former class, ergot stands almost, if not entirely, alone in the latter, and this we believe to be in accord with the best authorities upon the subject. The remarks upon the induction of premature labour by general practitioners, without a previous consultation, while many may deem them old fashioned, strike us as both sensible and forcible, for it may well happen that a physician whose practice has not been largely obstetrical, may, by a neglect of this precaution advised by Dr. Taylor, find himself most awkwardly situated, should he be sued for producing criminal abortion. As in England and France, the mere attempt to procure abortion is treated as criminal, the case is not affected should it be one of extra-uterine fœtation or monstrosity, or even should it be proved that pregnancy has not existed at all.

Birth and inheritance next confront us with their attendant intricate legal questions. Dr. Taylor thinks the best and simplest test of live birth is auscultation, for when the heart sounds can be distinctly made out there can be no difficulty in pronouncing that the child has been born alive; but until we can distinctly define human life and demonstrate its starting-point, there will always be room in these cases, for an ample display of casuistry upon the part of ingenious counsel. The law, being regarded as an exact science, capable of establishing its own rules of evidence, might perhaps best settle the matter by requiring proof of a

certain duration of undoubted life, to be determined by definite signs, even if such a series were somewhat arbitrary.

Treating of monstrosities, our author speaks of the Siamese twins, Chang and Eng, whose recent death has brought them again to the notice of the profession. Dr. Taylor says that he examined them carefully when they were first exhibited in London, when he seems to have diagnosed the intimate abdominal connection between them, which has since been proved to have existed, though he erred in thinking that they possessed a common peritoneal cavity. Two cases, which would formerly have been cited as instances of early fœtal maturity, are, as we think, very properly classed among superfœtations. They seem so distinct, and are derived from such indisputable sources, that we give them in extenso, although they are not new.

"1. William, first Baron Auckland, married Eleanor, second daughter of Sir Gilbert Elliot, Bart., and sister of Gilbert, first Earl of Minto, by whom he had fourteen children: amongst whom the fourth was the Hon. Caroline born on the 29th July, 1781, who lived sixty years, and the fifth the Hon. William Frederick Elliot, who was born on the 19th January, 1782, and survived twenty-eight years. The interval between the two deliveries was 174 days, and, allowing that fruitful intercourse took place a week after the first delivery, this would leave 167 days for the birth of a child showing its powers of life by reaching the age of 28 years. This is thirteen days less than the period fixed by experience for the rearing, and forty-three days less than the period assigned by Dr. Hunter for the gestation, of a child which could be born with sufficient strength to attain manhood. 2. Lord Cecil James Gordon, brother to the late Marquis of Huntly, married the eldest daughter of Maurice Crosby Moore, Esq., of County Tipperary, Ireland; and had a child, Evelyn, born on the 19th September, 1849, and a son, Cecil Crosby, born on the 24th January, 1850, both of whom are now living (1865). These dates leave an interval between the two deliveries of only 127 days; and deducting a week, the gestation of the second child, which has reached the age of 15 years, would be only 120 days, or four calendar months."

Dr. Taylor is disposed, vol. ii. p. 230, to allow large latitude to the duration of gestations, in opposition to the position of many medical jurists. In England the courts have recognized a pregnancy lasting forty-three weeks, and in this country a gestation of forty-five weeks and three days has been admitted to be possible.

The subject of infanticide extends over one hundred pages, being very fully considered in all its varied medical and legal aspects. Much space is devoted to some so-called tests of live birth which are finally judged by our author to be no tests at all, while some other criteria highly esteemed by other standard writers receive no notice whatever. As a prominent instance of this fault, we observe that no mention is made of the condition of the ossific centre at the lower end of the femur, which Casper and others hold to be so important and trustworthy an index of fœtal maturity. The docimasia pulmonalis is treated of at length and its great value vindicated.

The general impression left by a perusal of these pages is that infanticide is indeed contrary to law, but is at the same time a crime which judge, jury, and community alike, both in this country and Great Britain, too often unite in finding excuses for; insisting that its commission must be proved by evidence, against which no theoretical objections can be urged by a subtle attorney. While such is the tenor of public opinion, no wonder, that with a constantly increasing number of cases of this unnatural and heinous crime, but few convictions are reached—and we are

almost inclined to think it would be better to repeal existing statutes, and deny to the product of conception, that has not enjoyed some days of extra-uterine life, any rights which an adult is bound to respect —such a course would at least save much expense to the state. Dr. Taylor, however, thinks that by seeking a verdict of manslaughter rather than one of murder, justice would more frequently be done, and in this opinion he is supported by the result of several recent cases.

Rape and unnatural crimes are treated of with brevity, yet in a clear and practical manner, but the illustrative cases are too few, especially when rape upon adults is considered, concerning which subject of late years some valuable studies have been written and a few instructive cases recorded.

We pass over the subject of insanity, to which Dr. Taylor devotes one hundred and thirty pages, as one of too extended scope for the pages of this review, and also as being one in which general practitioners have little interest, as they are rarely or never summoned as experts in such cases.

There only remains the subject of life insurance, which has so grown of late years that it bids fair to soon have a large literature of its own. This portion of the work appears to have been rewritten and to have had much care expended upon it. The rules of some of the best European companies are given in full.

These rules are so rigid and the loop-holes so numerous, that we are impressed with the idea that the companies need never pay unless they wish to; the duty of self-preservation has indeed forced them to adopt stringent regulations, as the frauds practised upon them have been enormous, and the efforts to impose upon them have led to the perpetration of some of the most remarkable of modern crimes. Dr. Taylor's last chapter contains a record of some of these celebrated cases, a perusal of which will well repay the reader.

In taking leave of this work we feel that we have given but a slight idea of the value of its contents, which make it an invaluable aid to any student of the subject, and one which he cannot afford to do without. Where so much has been well done it may seem unfair to criticize slight defects, yet we deem it no injustice to admit that we have been disappointed to find so little reference made to the work of other authorities. This omission is especially noticeable with regard to Casper, who, in our opinion, has contributed more to enrich and establish upon a good foundation the science he so well taught than any other writer.

Dr. Taylor's style is plain and ungarnished, but always clear, and his meaning cannot be mistaken. We confess to a partiality for big books, and as we lay these volumes down we feel indebted to their author for many pleasant hours spent in reading them. S. A.

ANALYTICAL AND BIBLIOGRAPHICAL NOTICES.

ART. XXI.—1. *Transactions of the Obstetrical Society of London.* Vol. XV. For the year 1873. 8vo. pp. lx., 309. London: Longmans, Green & Co., 1874.

2. *Proceedings of the Dublin Obstetrical Society.* For session 1872–73. 8vo. pp. xvi., 202. Dublin: Fannin & Co., 1873.

THE Obstetrical Society of London numbered, January 1, 1873, 634 members, and held ten sessions in the year, with an average attendance of 34 Fellows and 5 visitors, the extremes being 19–3, and 53–17. It is, therefore, no exception to the rule, that a working society has but a moderate attendance; and it will also be found that a few busy men do most of the work, and find time to be present, when others, less occupied, *cannot possibly* attend.

The first article of the London *Transactions* is chiefly of local interest, as it applies particularly to the fatality under obstetrical practice by English midwives, and shows the importance of having such women educated by compulsion of law, for the protection of the poor who come under their care. This question will be found fully set forth in *Aveling on English Midwives;* and is one which will no doubt have to be considered with us at some future day.

Partial Severance of the Cervix of a Prolapsed Uterus, by a Ligature of Matted Pudendal Hairs. By N. COATES, L.R.C.P.—Married woman of 60; never pregnant; had prolapsus with partial protrusion of cervix for four or five years; was attracted to her condition by profuse hemorrhage after sitting on the stump of a tree, which pressed upon the protruding, strangulated mass, then as large as a walnut. The ligature, upon being cut through and removed, was found to have caused an ulceration into the neck, and to constitute a ring about the diameter of a pen-holder. It was no doubt formed of hairs from the labiæ, matted around the protruding cervix by the vaginal discharges.

The Address of Dr. Edward John Tilt, the incoming President, is mainly congratulatory, and recommends that in the future more attention should be paid to reporting cases of disease in women and children.

Case of Delivery by the Forceps in Face-presentation in Mento-lateral Position. By J. BRAXTON HICKS, M.D., F.R.S.—Mother in labour twenty-four hours when called in; face driven down partly into cavity of pelvis, in an exactly transverse position, with chin to left side. Long curved forceps applied in antero-posterior diameter of pelvis, with considerable difficulty for want of space anteriorly. Efforts made during traction to rotate chin forward, but to no purpose; face emerged transversely, as it had entered; pelvis presumed to have varied from the usual type. Child dead; occipital bone driven under the parietalia; vertical diameter of head not particularly reduced. Dr. Hicks was not conscious of exerting any great amount of power in traction.

Case illustrating the Treatment of Post-partum Hemorrhage by the Intra-uterine Injection of Perchloride of Iron. By HEYWOOD SMITH, M.D.—Woman aged 30; patient in British Lying-in Hospital; had had two children and four

miscarriages, with severe floodings in all the premature deliveries. Delivered January 26, 1872, after twelve hours' labour, of a full-grown male fœtus, with no unusual loss. Doing well for several days. On 9th day some hemorrhage, and passage of several clots; no apparent cause. Ergot administered. On 10th day injected into uterus one part strong liq. ferri perchlor. to eight of water. 16th day, bleeding not arrested, although lessened; injection repeated 18th, hemorrhage recommenced during night; injection one part to four. 20th day, injected equal parts No bad symptoms after any of these trials; no pain; slept well. 21st day, strong liq. ferri injected from a f ʒij syringe; followed by severe pain, referred to fundus. No more hemorrhage. The loss never amounted to a flooding, but oozed continuously, ceasing after each injection, and recurring generally only a short time before repeating the injection. Woman became violently sick, with vomiting, rapid pulse, delirium, distended abdomen, fever, and exhaustion. Died on 28th day. The uterus, on removal, measured five inches in length, nearly four wide, and walls three-quarters thick. Anterior and posterior surfaces marked with blackish streaks, evidently indicating the course of the uterine sinuses. The cavity, upon being laid open, showed that these were filled with black fluid, and their walls stained dark. A fragment of placenta, of the size of a filbert, was found retained. Space will not permit our giving a more minute anatomical description. Dr. Smith sums up the case as follows:—

"1. That post-partum hemorrhage, happening after complete contraction of the uterus, and therefore after the uterine sinuses have been emptied of blood, is evidently arterial.

"2. That when a solution of perchloride of iron is injected into the uterus, the sinuses take it up and carry it into the veins; the tissues also immediately surrounding the sinuses becoming stained.

"3. That the perchloride of iron does not produce contraction; nor, by coagulation of blood, blocking of the orifices of the uterine arteries; and,

"4. That the perchloride of iron is a styptic, the use of which in the cavity of the puerperal uterus is not innocuous."

A long discussion followed this paper, from which we extract the following opinions:—

1. That in obstinate hemorrhage, such as reported, the presence of a portion of placenta should be suspected, the uterus dilated, and the foreign substance removed.

2. That the solution employed is a valuable one, and has saved many lives, but cannot be used with safety unless very much diluted.

3. That the procedure should be employed only after other means have failed in causing uterine contraction and arresting hemorrhage.

Dr. J. J. Philips admitted the danger, but believed in the propriety of using a moderately strong solution, after removing any fragment of retained placenta, as desperate cases were in more danger from hemorrhage than the remedy employed. He had not noticed any severe pain after using the styptic. In one case he had met with, profuse hemorrhage occurred from a fragment of placenta being retained, on the 21st day; and, in another, not for five weeks.

At the next meeting the discussion was again entered upon, and at much greater length.

Dr. Snow Beck believed in there being great danger from the injection of styptics soon after delivery. The results appeared to be, that the hemorrhage continued with no ill consequence; that it ceased, and the woman either recovered fairly, or after a lingering convalescence; or that she appeared well two or three days, then became weak; pulse 130 to 160; abdomen tender and tympanitic, followed by vomiting, diarrhœa, peculiar delirium, and certain

death. He examined the uterus of Dr. Smith's patient, and found the utero-placental arteries open in many instances, and their canals free from coagula. He believed that the styptic was taken up by the veins, carried into the circulation, and thus caused death. He advocated the use of ergot, cold, compression, etc., and believed that failure was due rather to the mode of use than want of power in the remedies.

Dr. Bantock had produced death in seven or eight hours from a perchloride injection. He advocated early and long-continued compression of the uterus, so as to prevent inertia, and insure contraction.

Dr. Wynn Williams preferred applying the perchloride on a sponge introduced with the hand into the uterus, and to be removed as the organ contracted under its influence. He believed it quite as efficacious as the injection, and at the same time free from its risks.

Dr. Protheroe Smith recommended the substitution of the tincture of matico, which he had frequently used.

Dr. Barnes strongly advocated the use of the perchloride as the only reliable remedy in desperate cases, particularly in delicate, exhausted subjects; and believed that death, attributed to the remedy, might often be traced to exhaustion, shock, etc. The general opinion of the Society was rather in favour of the use of the perchloride.

Progress of Pelvic Pathology during the last Twenty-five Years. By Edward J. Tilt, M.D.—As seventeen pages of the volume are occupied by this paper, we can only refer to the "Propositions," which, he says, contain the pith of his work on *Diseases of Women and Ovarian Inflammation*, published in 1850, and which, he contends, have only been substantiated by the test of time, viz.:—

1. "The admitted frequency of inflammatory lesions in the ovaries and in the surrounding peritoneum is of much greater practical import than is generally admitted.
2. "Of all inflammatory lesions of the ovary, those involving destruction to the whole organ are very rare, while the most numerous, and therefore the most important lesions, may be ascribed to a disease that may be called chronic, or subacute ovaritis.
3. "As a rule, pelvic disease radiates from morbid ovulation.
4. "Morbid ovulation is the most frequent cause of ovaritis.
5. "Ovaritis is the chief cause of pelvic-peritonitis.
6. "Blood is frequently poured out from the ovary, and from the oviducts into the peritoneum.
7. "Subacute ovaritis not unfrequently causes and prolongs metritis.
8. "Ovaritis often leads to considerable and varied disturbance of menstruation.
9. "Some chronic ovarian tumours may be considered as aberrations from the normal structure of the Graafian cells."

On the Pathology of certain so-called Unilocular Ovarian Cysts. By George Granville Bantock, M.D.—The nature of the peculiar cystic disease in question is best shown by reference to a specimen exhibited, and described as follows: "It consists of the uterus and its appendages as they were removed from the body of a patient æt. 16." Ovary healthy on right side. In the fold of peritoneum between this ovary and Fallopian tube, that peculiar organ, the parovarium, or organ of Rosenmüller, is plainly seen. At its outer angle, nearest the tube, you will observe a small cyst, about as large as half a field bean, evidently originating in one of the tubules of the organ. On the left side, ovary also healthy; parovarian cyst as large as the ovary. Of the size of such cysts when developed the author says: "It has gone forth

stamped with the high authority of West, that parovarian cysts never attain a greater size than that of an orange, and I cannot allow it to pass without a few words." He then argues, that from the situation of the cyst, its vascular supply, the thickness of its walls, and nature of its contents, there can be no limits to its dimensions, or liability to rupture from distension. He opposes the idea of Dr. Meadows, on anatomical grounds, and denies the possibility of the cyst having originated in the hilum of the ovary. He also says that all unilocular cysts in the neighbourhood of the ovary, or involving it by contact, though leaving it healthy, are of parovarian origin; and that there is no such thing as true unilocular or unifollicular disease of the ovary, except in its earliest stage.

1. *Case of Extra-uterine Pregnancy; Gastrotomy successfully performed*, by WILLIAM ROSS JORDAN. 2. *Case of the same*, by JOHN SCOTT, F.R.C.S., with operation. 3. *Case of the same*, by ALFRED MEADOWS, M.D.—These three cases have been already noticed in the number of this Journal for July, 1873, p. 276–8.

Hypertrophic Elongation of Cervix Uteri at Full Term of Pregnancy. By GEORGE ROPER, M.D.—Primipara, age 22; cervix protruding about three inches, and thick as a man's wrist; whole length about four inches; canal size of index finger; structure hard and firm; been in labour thirty-six hours; some expansion of neck above. After four more hours made seven incisions in os externum at equal distances, and extending an inch and a half within; gradual expansion for sixteen hours; used forceps; child living; recovery as after ordinary labour. Two months after delivery found cervix proper but slightly larger, or longer than natural; hypertrophied extension soft and flabby like a prepuce—this was removed. Woman has had several children since, with easy labours. Removal of elongated cervix after involution necessary, to avoid a repetition of development, with the same trouble in after pregnancies.

Case of Complete Uterus Bicornis; the septum extending into one common cervix; Pregnancy of Right Horn; Turning and Extraction on account of Pelvic Contraction, the conjugate diameter measuring only two and a half inches. By E. H. M. SELL, M.D.—Chiefly interesting from rarity. Woman single; thirty-one; Bohemian. Professor Braun diagnosed *uterus bicornis*. Right impregnated; left containing protruding decidua. Child female, four pounds and fourteen ounces; asphyxiated; restoration after half an hour's work by means of artificial respiration, frictions, sprinkling with cold water, etc.; discharged in thirteen days.

Diagnosis of Subacute Ovaritis. By EDWARD JOHN TILT, M.D.—This paper was noticed in the number of this Journal for January last, p. 275.

Necrosis of Ossa Pubis following Delivery.—Dr. PLAYFAIR exhibited a specimen of this rare form of puerperal disease, remarking that two, reported by Trousseau, were all that he had found recorded. The specimen came from a young primipara of 23, who had good health until the time of her labour, which was easy and natural. Three weeks after delivery an abscess burst at the anterior portion of the left labium minus, and discharged a small quantity of offensive pus; after which she had pain and tenderness in left inguinal region, with inability to straighten the corresponding thigh. There was an offensive purulent discharge from the vagina; left thigh became œdematous at its upper part, ending in abscess. Died of exhaustion in nine weeks after delivery.

Pubic bones found entirely necrosed, and symphysis disintegrated and destroyed, from which extended a large sac partly filled with pus, and communi-

cating with the vagina, and also the left groin, where there were openings by which it discharged.

Dr. Playfair believed the disease to originate in some obscure form of septicæmia, giving rise to a low form of inflammation in the bones and periosteum.

Two Cases of Extra-uterine Fœtation. By D. C. McCallum, M.D.—1. In fourth month of pregnancy attack of indigestion, with vomiting, resulting in rupture of a tubal cyst, followed by death in about three-quarters of an hour. Large amount of blood in abdomen; uterus enlarged, and inner surface covered with a well-marked decidua.

2. Rupture at an early period; intense abdominal pain, followed by symptoms of collapse. Patient believed to be in second month of pregnancy; treated with opium and stimulants; recovered slowly in two months. Had had four children; became again pregnant, and was delivered seventeen months after the attack.

These reports remind the reviewer of two somewhat similar cases in his own practice. The first was tubal, in the first month, and death resulted in twenty-three hours. The second was also very early, and the patient, after going down as near to death as I have ever seen one to do that did not actually die, recovered slowly, has since borne another child, and is now quite robust. In the first case the mother was menstruating at the time of the accident, which resulted from pressure exerted in ascending a stairway. The cyst was about the size of a common plum, and the rupture that of a quill.

The Use of Intra-uterine Stems in Uterine Disease. By C. H. F. Routh, M.D.—As this is a question which has recently excited considerable notice, we will endeavour to give the important points of the article.

Intra-uterine pessaries have been much abused, and their use condemned; but experience has shown that their use is advantageous in many cases when properly applied.

1. "All inflammatory or congestive symptoms about the uterus or ovaries should be first treated and removed," many of the accidents, such as abscesses, metritis, and even peritonitis being due to the neglect of this precaution. If the slightest pain is felt in passing the sound, and if this is especially marked at the fundus, it is dangerous to use the stem until after treatment shall have removed the difficulty.

2. "It is important in some cases to enlarge the uterine canal" For this purpose carefully cleansed and dried sea-tangle tents are recommended, as having much more power of expansion than sponge; or the hysterotome may be required.

"There are four classes of cases in which the intra-uterine pessary should be employed, viz., in cases of membranous cervix; certain cases of amenorrhœa; also of dysmenorrhœa, whether mechanical or simply neuralgic; and in uterine flexions."

These points in the use of the stem pessary are all illustrated by reports of cases benefited by its employment. Dr. Routh never introduces a stem more than two inches long, except where the uterus is preternaturally elongated.

The discussion, after the reading of the paper, showed that there was a great diversity of opinion upon the value and innocence of the stem-pessary.

2. *The Dublin Society* has had an existence of thirty-five years, and numbers 142 members.

On Endo-metritis.—The paper of Lombe Atthill, M.D., is a full and valuable clinical one. The *symptoms* enumerated are: Leucorrhœa, pain, dysmenorrhœa, or sometimes irregular menstruation, menorrhagia, and reflex irritation. The *physical signs* are increased length; size of the cavity of, and

bulk of the fundus of the uterus; increased sensibility of the mucous membrane lining the cavity of the organ; a patulous os internum, and often an abnormally sensitive condition of the mucous membrane at that point; displacements anteriorly or posteriorly of the fundus resulting from increase in size and weight.

Dr. Atthill recommends local depletion by punctures of the cervix; dilatation by sea-tangle tents, and subsequent application of fuming nitric acid to the uterine cavity; and the introduction of a piece of solid nitrate of silver, which is allowed to remain. He condemns the use of liquid injections as dangerous, but regards the fuming nitric acid as free from risk. He has invented an intra-uterine speculum to be used after dilatation, and through which he makes his applications.

On the Constitutional Character and Treatment of the Diseases of Women, connected with Chronic Inflammation of the Uterus. By THOMAS MORE MADDEN, M.D.—"Chronic inflammation of the neck of the womb is the most common of all the diseases peculiar to women." Of 6300 cases of diseases of women in dispensary practice, rather more than one-tenth were of this class; and the proportion in private practice is fully as large as in hospital or dispensary experience.

The author believes the apparent increase of uterine diseases to be due to the fact, simply, of their more ready detection since the revival of the use of the speculum; and whilst using the instrument to a great extent, regards it as justifiable only where absolutely demanded for diagnosis and treatment. He objects to the use of Sims's duck-bill speculum in ordinary cases, and especially to the employment of his tenaculum in drawing down the uterus. He believes the tactile sensation sufficient for diagnosis in most instances, and regards the speculum as mainly of value in treatment.

Sterility almost always accompanies chronic cervical inflammation, and as long as it exists to any serious extent the patient must remain barren; and it is useles to attempt to remedy this condition by any form of surgical operation.

In the majority of instances of supposed heart-disease in women, and especially in hysterical subjects, he believes the symptoms due to uterine inflammation, and to be removable by its cure. He regards chronic inflammation of the uterus, and its results, including ulceration, as a consequence of a coincident constitutional disease, and, therefore, not to be cured by local measures except in rare instances. As constitutional remedies he recommends cod-liver oil, preparations of iron, and iodine; quinia, and mineral waters; believing the disease, in many instances, to have a strumous origin, and, in some, a gouty, rheumatic, or syphilitic one, and to require a corresponding treatment proper for such maladies.

Dr. Madden gives the credit of first applying the solid nitrate of silver within the cavity of the womb to Dr. Kennedy, of Dublin (1847); to Dr. Denham that of leaving a portion in the uterine cavity; and to Dr. Kidd that of dilating the cervix with sea-tangle tents, and applying fuming nitric acid in intra-uterine affections—all of them Presidents of the Dublin Obstetrical Society. He highly recommends, in congestion of the cervix, the application of a ball of cotton saturated with glycerine, as employed by Dr. Sims. He employs, for simple ulceration of the cervix, strong tincture of iodine, applied twice a week; and, when there is suspicion of syphilitic origin, the nitric acid. He does not recommend the use of potassa cum calce, or caustic potash, as they are difficult to limit in action, and may produce acute metritis. For hyper-

trophy of the cervix he prefers, in most instances, iodine dissolved in glycerine, to any destruction of the part by escharotics.

On Dactylitis Syphilitica, a specific affection of the Fingers and Toes. By J. Moyan, M.D.—This peculiar form of inherited syphilis appears to manifest itself at a later period than the more usual types of the disease. Dr. Moyan exhibited casts taken from the parts affected, showing their globular form, and looking as if the thumb were thrust through an India-rubber ball. He reported the case of a child whose mother had given birth to two healthy children, then been syphilized by her husband, and produced the infected subject. The enlargement, after some time, became coloured on the surface, then tense, and of a purplish-red; and, when opened, gave exit to a thin fluid, under which gummatous matter appeared. The disease affected a foot and one thumb, and was seven months getting well. Another case was in a boy of nine years of age; and a third in one of eleven, which was a very severe one. He had eight marks of gummatous suppuration from time to time.

Dactylitis generally occurs in the first joint of a finger, and on the dorsal, rather than the palmar aspect. The skin is at first whitish, very tense, and has a creaking sensation; but afterwards becomes coloured, as before mentioned.

"It was a disputed point whether the father could produce a syphilitic child without affecting the mother: but the influence of the mother beyond yea or nay was very potent. He saw a case of a mother producing a healthy child, and the child remaining healthy for two years. The mother was one of the worst cases of syphilis in the hospital, and was under treatment in it for two years. The child did not show any signs of syphilis until the end of two years, and then it showed severe syphilitic taint." p. 102.

Treatment of Vesico-vaginal Fistula, with loss of Urethra, Neck, and Floor of Bladder. By George H. Kidd, M.D.—After speaking of the difficulties and unsatisfactory results of the operations of Jobert and Baker Brown, the former closing the vulva, and making an opening into the rectum; and the latter making a new urethra under the arch of the pubis above the old one, and then drawing down the uterus, and bringing the sides of the vagina together, Dr. Kidd reports a case where he closed the vulva, leaving a long, narrow passage close to the pubes, which might answer the purpose of the urethra, and enabled the woman to retain her urine by means of a spring truss-like compressor, after the description of Trélat, of Paris, as shown in the *Gazette des Hôpitaux*, Dec. 30, 1865.

Drs. Atthill and Johnson performed similar operations with success, the latter at the suggestion of Dr. Kidd. In Dr. Atthill's case a part of the urethra was left.

Epilepsy during Menstruation from Occlusion of the Vulva, cured by Operation. By Dr. Morgan.—The subject of this was a single woman, æt. 22, strong, and well developed; occlusion from sloughing, following fever. Cicatricial web excised; parts kept separated by a tent until healed over; epilepsy ceased.

This case is of interest when compared with those reported by Dr. Sayre, of New York, where three boys were cured of partial paralysis, resulting from reflex irritation, by circumcision of a congenital phymosed prepuce in each instance. The affection of the nervous system, although of a different type, was no doubt due to reflex action from the same system of peripheral nerves in the woman and boys.

Cases of Amenorrhœa from Congenital Malformation. By Fleetwood Churchill, M.D.—These are instances of the effect of defective sexual de-

velopment upon ovulation, menstruation, sexual passion, and the external marks and contour of womanhood, which may be summed up as follows, viz.:—

1. Sexual passion indicates, even without menstrual discharge, the presence of at least one ovary.

2. The absence of such passion is no proof of the want of ovaries, as multiparæ not unfrequently have never had any sexual gratification.

3. Where the want of this passion is associated with a want of mammary development and womanly contour, it is to be presumed that the ovaries are undeveloped.

4. Menstrual epistaxis is believed to be generally associated with ovulation.

Dr. Ringland related a remarkable case of unilateral development. The woman was 20, and had never menstruated. She had no clitoris, vagina, or uterus; the urethra being close to the anus. She had an ovary on the left side; left breast was developed; hair on pubes only on that side, and left labium alone developed.

Dr. Kidd was of the opinion that in some instances the uterus and ovaries remained inactive, or were in an infantile state, which might be remedied by the galvanic pessary, stimulating them into development or activity.

Chronic Inversion of the Uterus. Case of five months' standing reduced by GEORGE H. KIDD, M.D., and one of seven months by G. JOHNSTON, M.D.—In both cases the inversion resulted from traction upon the cord, and each was subject almost continually to hemorrhage. The reduction was effected by grasping the uterus, and, by degrees, forcing it through the os, the woman being under the influence of chloroform. Dr. Johnston states the time required in his case as twenty minutes; Dr. Kidd as five to ten. Both made good recoveries.

Dr. McClintock reported a case where he had made three attempts at reposition, but failed, although it seemed to be at first a favourable case, the bulk of the uterus not exceeding that of a walnut. He subsequently amputated the uterus, and the woman recovered. After removal the uterus could not be re-inverted without using force sufficient to lacerate it. Several instances were reported of pregnancy in cases of reduced inversion.

Diagnosis and Treatment of Uterine Polypi. By THOMAS MORE MADDEN, M.D.:—

"The distinction made between intra-uterine tumours and intra-uterine polypi is quite untenable, as their structure is identical; either may be encapsuled, and their symptoms cannot be distinguished. In fact, an intra-uterine fibroid polypus is but a more advanced stage of a submucous tumour which has lost its sessile form from its own weight, as it grows downwards, becoming constricted at its point of projection from the uterine wall, so as to constitute a pedicle."

Symptoms.—Menorrhagia, or persistent metrorrhagia, and profuse or fœtid leucorrhœa; a sense of weight from the enlargement of the uterus; pain, from a mere soreness or dull aching in the lumbar region, to the most intense uterine colic; pressure on the bladder or rectum from displacement of the uterus; and impairment of the patient's health from the hemorrhagic and leucorrhœal discharges.

Treatment.—Removal of the polypus either without or after dilatation of the cervix, as may be necessary; and the application, subsequently, of strong nitric acid on cotton, followed by tepid vaginal injections twice a day of infusion of chamomile. Where surgical treatment is impracticable, or will not be submitted to, Dr. Madden recommends the use of bromide of ammonium or potassium, and small doses of tincture of iodine, to be persevered with for some

months at a time; the local application of iodine to the tumour, and tepid or cold injections by means of a uterine douche.

Dr. Kidd said he had never seen much benefit from medical treatment. He thought that chloride of calcium made patients more comfortable than any of the drugs recommended, but had never seen it cause absorption of the tumour.

Dr. Churchill held the same views. He referred to the great danger of dilating the *internal* os uteri with a tent.

Dr. Atthill spoke of the dangers of using cold water injections into the vagina, and the risks to be run by dilating the cervix for repeated applications to the tumour. He recommended that they should be made through a tube.

Ovarian Dropsy, with Unusual Quantity of Fluid. By Dr. E. G. Brunker.—The subject of this case was married at 40; circumference of abdomen sixty-three inches; breathing free; slight emaciation; functions of bowels and kidneys healthy; size increasing for some years; gave birth to a healthy child a year before; occasionally menstruates. Ten gallons of dark, oily fluid drawn off; no distinct tumour to be felt. Recovered rapidly. Ten gallons of similar fluid, but lighter in colour, again removed in ten and a half months. In interval says she led an active life, enjoyed good general health, and menstruated at irregular intervals. Still under care when reported.

Art. XXII.—*The West Riding Lunatic Asylum Medical Reports.* Edited by J. Crichton Browne, M.D., F.R.S.E. Vol. III. 8vo. pp. vi., 349. London: Smith, Elder & Co., 1873.

In the Journal for January, 1872, we gave an account of the objects of this publication, with a notice and abstract of the essays which made up its initial number. A year later we noticed the second annual volume. The present collection consists of fourteen articles of very diverse merit.

The first paper is by Wm. Turner, M.B., Professor of Anatomy in the University of Edinburgh. It is styled *The Convolutions of the Human Brain considered in Relation to the Intelligence.* We find first a *resumé* of known facts as to the weight of the brain in different races, sexes, and individuals. A description of the convolutions follows. Speaking of the relation between high intelligence and well-marked convolutions, the writer admits that the concurrence of the two, though common, is by no means constant or without striking exceptions. In certain lower animals, too, greater intelligence exists in species with smooth brains than in others whose cerebral surface is convoluted. Should it be suggested that the thickness of the cortical substance might be the test and measure of cerebral activity, the writer would reply that in some localities, and some individuals, the proportion of cerebral cells to connective tissues is greater than in others. These cerebral or nerve cells, too, differ in size among themselves. The author seems inclined to believe that the largest of these are the most efficient. Vascular supply, everywhere needed to insure proper functioning, must influence cerebral activity, by its quality and its amount.

Having thus directed attention to conditions other than mere bulk or extension, the writer reviews the chief arguments of those who believe that different powers and faculties are localized in certain definite convolutions. Proof of such views he thinks is still wanting. Believing that the object of the convoluted structure is to increase the amount of gray matter, and of the peculiar

cells which it contains, he does not believe that diversity of function can be ascribed to different convolutions. The proper direction of research, for those who seek to establish localization, he thinks should be to show by microscopic evidence, some persistent and characteristic differences in the cells of different localities.

The second essay on *Experimental Researches in Cerebral Physiology and Pathology*, by Dr. FERRIER, has already been noticed in our pages.

Dr. HERBERT C. MAJOR, who has before recorded valuable microscopic observations, continues work in this direction, and here records the results of examination in a number of diseased brains. The style of this paper, on the *Histology of the Brain in the Insane*, is such as to inspire us with great confidence in the care, skill, and judgment, of its author. Good, honest work, such as shall afford trustworthy material for future generalizations, seems to be his object, rather than the attainment of notoriety, or making a sensation. Its modesty and candor make the article a model of its kind.

Dr. J. MILNER FOTHERGILL furnishes a paper on *The Heart Sounds in General Paralysis of the Insane*. Having noticed, almost by accident, some peculiarity in the cardiac sounds in several patients affected with paresis, he was led to extend his observations, when he met with results wholly unforeseen. Out of fifty-five cases auscultated, forty-four presented a decided increase or "accentuation" of the second or aortic sound. This same peculiarity, he reminds us, has been pointed out as a most frequent symptom in chronic Bright's disease. Seeking for an explanation of this feature common to four-fifths of the general paralytics, Dr. Fothergill finds but one condition, capable of causing the phenomena, which could be supposed to be thus generally present. This condition he believes to be increased vascular area, and consequently increased blood supply, throughout the cerebro-spinal system. The larger and heavier column of blood above the valves causes their more forcible closure. To support this view he examined several cases of active mania in which cerebral hyperæmia was believed to exist, and actually found a similar alteration of the second sound. Moreover this accentuation diminished when the patients were made to lie down. Evidence is also adduced to prove the existence of distended cerebral bloodvessels in the early stages of paresis; and the writer believes that, later, the obstructive influence of degeneration would have the same effect on the second sound.

The possibility of very considerable variation in the amount of blood contained in the brain, is believed, by Dr. Fothergill, to be due to corresponding inverse change in the serum occupying the peri-vascular canals.

Unlike another contributor to this volume, Dr. Fothergill deems insanity rather antagonistic than favourable to heart disease. He approvingly quotes Griesinger, to the effect that "affections of the heart are rather rare than frequent in the insane."

Dr. T. W. MCDOWALL, a resident of the asylum, makes a beginning in this number, of what promises to be a somewhat elaborate investigation into the *Power of Perceiving Colours, possessed by the Insane*. In the *resumé* here given of our knowledge upon the general subject of colour discrimination, the writer adverts to the scarcity of authorities. The subject has been thoroughly treated, he says, but the works upon it are shut up in foreign libraries. Although Dr. McDowall's personal inquiries are as yet not much more than begun, he has already found reason to believe that much curious and novel truth may be elicited by this investigation.

A practical paper upon the *Nitrite of Amyl in Epilepsy* is the work of Dr. BROWNE, chief of the asylum, and editor of the Reports. Some experiments here

recorded having indicated that epileptics were peculiarly susceptible to the action of this drug, and that action seeming to be in some respects the reverse of what takes place during an epileptic seizure, the idea not unnaturally suggested itself to Dr. Browne, that the nitrite might be of service in warding off paroxysms of epilepsy. Without meaning to dogmatize as to the nature of the seizure, the writer believes that there always occurs, at its commencement, an intense contraction of the cerebral bloodvessels. As the inhalation of the drug causes vivid and extensive blushing, owing to capillary dilatation, it would seem not unlikely, given at the right moment, to prevent or lighten a fit. And so it has proved. In a case where the fits occurred daily, inhalations three times a day postponed them for nineteen days. Though the seizures reappeared upon partial abandonment of treatment, yet, later, they were quite infrequent when medication was wholly given up. The night attendants upon epileptics were now provided with the medicine, and instructed to administer it to any patient in whom they noticed the signs which experience had shown to be the precursors of a fit. To the surprise and pleasure of Dr. Browne, it was found that not only were seizures prevented by treatment of the prodromata, but that convulsions actually begun were nipped in the bud, cut short, and arrested. In that terrible state known as the *status epilepticus*, inhalation of the nitrite was tried with the best results. The drug seemed to possess the power absolutely to break up the morbid habit. Unless the writer has deceived himself, as well as his readers, we must believe that the nitrite saved several lives under his observation.

We regard this paper as one of the greatest importance. The moderation of the writer in not claiming curative power for the nitrite of amyl, gives the greater weight to his opinions as to the value of the drug, in preventing suffering, and saving or prolonging life. We may be mistaken, but we cannot help thinking, that the nitrite of amyl is destined to work a revolution in the treatment of epilepsy. We cannot avoid indulging a hope that this drug, added to ordinary judicious medical treatment, may be found adequate to the complete control of epileptic fits. Whether it can prevent the manifestation of the constitutional weakness in some way, is a different question.

Dr. J. Hughlings Jackson contributes a paper entitled *Observations on the Localization of Movements in the Cerebral Hemispheres, as revealed by Cases of Convulsion, Chorea, and "Aphasia."* We must confess our inability to catch the drift and intention of this article. Other readers, however, may be more quick of apprehension.

Dr. John Lowe furnishes an article *On Electro-excitability in Mental and Nervous Diseases.* The special object which he has kept in view in the observations here recorded, is to ascertain the diagnostic uses of electricity in nervous and cerebral diseases. So far, he very candidly admits, this investigation has borne but little fruit. With the hope of eventually reaching some results of value, he proposes to continue the very arduous and tedious experiments which he has begun.

A long paper by J. Wilkie Burman, M.D., on *Heart Disease and Insanity*, embodies the results of great labour and extensive research. We would be glad to believe the results obtained are proportionately valuable. The writer starts with the idea, that as insanity is on the increase, while "heart disease," as a cause of death, appears in slightly increasing proportion in the mortality tables, there is, therefore, probably some connection between the two. Confirmation of this surmise is obtained in the following manner: The counties of England and Wales are divided into two groups, in one of which are all those wherein mortality from heart disease is above the average, and in the other

those wherein it is below the average; and then our attention is directed to the startling fact that the proportion of lunatics to the thousand inhabitants is 2.34 in the first group, and but 2.14 in the second! The importance of this result may be better appreciated when the reader is informed that the ratio varies among these counties, from 3.3 down to 1.3.

Dr. Burman believes that after making due allowance for the greater age of hospital patients, as compared to the population at large, there is still an excess of heart disease among the former class. We believe, however, that it is and must be, impossible numerically to determine just what allowance should be made for the different circumstances of the two classes; and that therefore no trustworthy results can be attained in this matter by the use of figures. Our readers will notice, by turning back a page or two, that Drs. Fothergill and Griesinger hold an opinion precisely opposite to Dr. Burman's.

The large number of hearts carefully examined and weighed at the West Riding Asylum, some five hundred, certainly indicate the general prevalence of some degree of hypertrophy. The male hearts averaged 12.62 ounces, and the female, 10.26: the normal standards being, according to Reid, 11 ounces and 9 ounces. Yet the writer admits that in over 500 insane dying in the Somerset Asylum, the heart-weights were decidedly different, male hearts being 11.14 ounces, and female 8.67. The proportion of perfectly healthy organs among those recorded at the West Riding, was only one-fifth. Among 680 living male patients, signs of cardiac disease were found in 44 per cent. This certainly is a very different state of things from that indicated by Dr. Fothergill, when he speaks of heart-disease as "somewhat rare among the insane."

Dr. Burman's paper is very elaborate and complete. It contains the record of very numerous observations, professes to indicate the comparative frequency of cardiac affection in different forms of insanity, and the various forms and degrees which that affection assumes. Yet, in view of the very ill-grounded assumption with which it begins, and the directly opposite testimony of other observers, we cannot give to it that measure of confidence which we could wish.

Notes on the Condition of the Tympanic Membrane of the Insane is the title of a paper in which Dr. JOHN C. GALTON, a clinical assistant at the Asylum, announces the object, method, and first results of a new line of investigation by him commenced. The idea seems to be that the visible engorgement of certain vessels in the external or cuticular layer, and the internal mucous coat, of the membrana tympani, affords an indication of cerebral hyperæmia similar to that often derived from ophthalmoscopic observations.

The observations so far made tend to show that a dilated condition of these vessels is common in confirmed epileptics; and that such condition can be produced, frequently, by the inhalation of nitrite of amyl, in healthy subjects.

The writer very judiciously points out certain particulars in which this physical examination is freer from disturbing influences than that of the retina. No pain, affright, or suddenly increased stimulus to the organ, here occurs to affect the correctness of the observation.

Dr. ALLBUTT, a contributor to preceding volumes, furnishes a brief article upon the *Obscurer Neuroses of Syphilis*. A few new illustrative cases are presented, but no new truths are elicited.

W. C. S. CLAPHAM, Esq., has compiled from the records of the Asylum the statistics concerning the *Weight of the Brain in the Insane*. Averages of some 700 brains are given according to age, character of disease, and nationality.

The Change of Life and Insanity, by HENRY SUTHERLAND, M.D., is chiefly valuable for its presentation of the facts and conditions concerning some one

hundred female patients of the Asylum, attacked with insanity soon after this epoch.

The volume is completed by another essay by Dr. J. H. JACKSON *On the Anatomical, Physiological, and Pathological Investigation of Epilepsies.*

B. L. R.

ART. XXIII.—*Transactions of State Medical Societies.*

1. *Transactions of the Indiana State Medical Society*, 1873. 8vo. pp. 142.
2. *Transactions of the Medical Association of the State of Alabama*, 1873. 8vo. pp. 112.
3. *Transactions of the Colorado Territorial Medical Society.* 8vo. pp. 56.

1. *Indiana State Medical Society.*—In the opening address by the President, we have some not uninteresting reminiscences of a professional career of forty-eight years in one county of Eastern Indiana. Dr. Pennington believes that a decided change of type has occurred in the diseases of his district. He is inclined to believe this to be in some way connected with the cholera epidemic of 1832. Inflammations, and the febrile symptoms of various diseases were much more intense and more sthenic before that period than now. Free bleeding, antiphlogistics, and mercurial purges, given in the hot stage of intermittent fever, would often, he says, completely arrest the disease, without a second paroxysm. Pleurisy and pneumonia were treated, with almost equal alleged success, by venesection and antimony. "We seldom lost patients from acute diseases. It would have detracted from the standing of a medical man should it have been known that he lost a patient from inflammation. He might lose a patient from sheer debility, and be excusable; but not from acute disease, provided he saw the case in an early stage of the attack." Pregnant admission! The patient had the melancholy satisfaction of knowing that his physician prevented (in the old sense) the natural termination. Notwithstanding his belief in a change of type, Dr. P. thinks that active treatment has been too much supplanted of late by the expectant practice. Brief notices of some of his contemporaries close this address of the President.

An obscure case, supposed to result from *infection with glanders*, is reported. Death occurred after eight months. An instance of protracted presence of a *foreign body in the ear* is narrated by Dr. WRIGHT. A bean was removed from the meatus twenty-two years after the patient (then a child) had placed it there. *Disease of the antrum*, with nervous symptoms, and *annually recurrent abscess* in one eyelid, are cases briefly reported.

Interesting articles discussing *arterial thrombosis* and resulting gangrene, each illustrated by an original case, are contributed, one by Dr. HOUGHTON, and another by Dr. BUTLER.

A report is presented embracing brief statements of health and disease in the different counties. The most noticeable point seems to be the general prevalence, during the cold and wet months, of cerebro-spinal meningitis. Mortality seems, so far as stated, to have been about one in four. Influenza was widely observed as following the epidemic horse-disease.

A case of *rupture of the uterus and vagina*, followed by recovery, has its value sadly marred by ungrammatical and incomprehensible expressions. Absence of any revision, by author or proof-reader, is apparently the cause, but not an excuse for this state of things.

In a notice of the Medical Society publications of some other States we recently ventured to use plain terms in characterizing some of the papers admitted into their volumes by too indulgent committees. We are sorry to say that two articles in this pamphlet are utterly unworthy of print. One of them is simply shameful. Grammar and orthography are outraged in nearly every line, and every possible literary vice is amply illustrated. It is a disgrace to the medical profession in America to allow such effusions to appear under the sanction of State medical societies.

2. The present volume of *Transactions* of the Alabama Association is principally made up of general reports from a few counties, and of the proceedings at the annual meeting, including the amendments then adopted to the constitution. The latter instrument, as revised, is printed in full in the last dozen pages of the pamphlet. We confess to a feeling of profound thankfulness when we discovered that the "Addresses" or "Orations" common to similar publications were here limited to one of each title.

The address of the President, Dr. GEORGE E. KUMPE, is thoroughly sensible and practical, wholly free from "fine writing" and "fervid eloquence." It deals briefly with matters of special interest to the physicians of the State, such as epidemics, legislation required, changes in the constitution of the Association, and medical education. We learn that it was upon Dr. Kumpe's motion that an admirable provision was six years ago inserted in the constitution requiring examination, before the censors, of any would-be student, prior to his admission as pupil into the office of a member. Attainments were specified corresponding to those resulting from a good high-school education, with fair acquaintance with English literature and composition. Without a favourable report from the censors, after such examination, no fellow of the Association could receive a student under penalty of six months' suspension. This rule, however, after serving an admirable purpose, has been modified, and we fear practically nullified, in the recent revision. The examination is put into the hands of the censors of *county* societies, and these are allowed ten years' delay before enforcement. Physicians entering the State *may* apply to the censors of the General Association; and the local societies are instructed to examine all new-comers, and withhold all professional recognition from such as do not pass. But this, again, contains the unfortunate "ten years" proviso. And no statement is made of the treatment of non-applicants for the examination. Thus, we are sorry to judge, a step has been taken backward.

Of the inevitable oration what need to speak? Suffice it to say, it is not quite so extreme a specimen as some we have attempted to characterize. Committees on publication should be taught that the profession hold them gravely accountable for that ill-judging easiness of disposition which alone can explain their acts.

In one of the county reports we observe that during ten years the physician writing had not met a single case of scarlatina. Rubeola, however, was common, and at times epidemic.

In a surgical report from Sumter County we find a case of the *removal*, for fibroid disease, of the *entire uterus and both ovaries*. In removing this mass, weighing over six pounds, the whole of the small intestine was lifted out of the abdomen to gain room. Five silk ligatures were applied to arteries, cut close, and allowed to remain. The cavity and bowels being carefully sponged with tepid water, the incisions were closed with silver sutures, covered closely and tightly with bands of adhesive plaster. The operation was attended with severe shock, and followed by violent vomiting. During a paroxysm of retch-

ing a knuckle of intestine protruded through the wound, and was slightly torn by a wire suture. The edges of the rent were fastened to the edges of the wound [printed *womb*] in the abdomen. Symptoms of pyæmia repeatedly occurred. On the tenth day clots and pus were discharged through an incision in the posterior vaginal wall. Incisions in abdomen, except at fistula, healed by first intention. Sutures removed on tenth day, but supporting plasters longer used. This patient fully recovered. Attempts made to close the fistula reduced it to dimensions not practically troublesome. Three years afterwards the patient, a negress of 36–40, was in perfect health, working daily, and enjoying the attentions of her husband as much as ever. The reporters attribute removal of alarming symptoms of septic poisoning to calomel in purgative doses, although using beef essence and stimulants.

A very extreme instance is reported by Dr. Webb of a *thumb smashed off*, all but a strip of skin one-eighth of an inch wide, in which the soft parts united by first intention [printed *insertion*], while subsequently the bony fracture healed, and the member became as good as new. Perfect exclusion of air and water, with carbolic acid and glycerine over the bandages, are the means which proved so wonderfully efficient.

Cases of *malarial hæmaturia*, and of *malarial neuralgia* of stomach and bowels, as described by Dr. Galt in this Journal, April, 1872, are reported very intelligently by Dr. Webb. One hundred and twenty grains of quinia, in three doses, within twenty-four hours, were given to a lad of fifteen attacked with hæmaturia. The drug had not been ordered in such large doses by the physician; but the patient was well on the third day.

Five cases of *puerperal convulsions*, successfully treated by veratrum viride, are reported. Doses seem rather alarming—twenty to thirty drops, soon repeated; while one gentleman recommends from thirty drops to a teaspoonful every fifteen or twenty minutes. The preparation used is not stated.

3. The annual address of the President of the *Colorado Territorial Medical Society*, without possessing anything specially original, is brief and sensible. The importance of gaining and diffusing accurate knowledge concerning the peculiar climatic features of the territory is earnestly urged upon the members. Investigation into the influence of the climate upon different forms of disease should be thorough and conscientious.

The President has full faith in the curative influence of Colorado climate in asthmatic cases. Hay asthma, too, he believes, is especially sure to be cured, or escaped, by a residence among the mountains.

In a report on surgery by Dr. H. K. Steele, of Denver, the statement is made that during the late rebellion two surgeons in Georgia employed the "bloodless method" of operating, by first compressing the artery, and then tightly bandaging from the extremity upwards. Their names are given as Sanders and Hawthorn. A more notable illustration of the little real novelty to be met with under the sun is given in a letter dated March 19, 1823, in which a new method of lithotomy is proposed. The anus, says the writer, may easily be dilated sufficiently to receive the whole hand. This being done, with the rectum empty and the bladder filled with mucilaginous liquid, cut through the recto-vesical septum, and remove the stone with the fingers. The operation, we are told, gives little pain, and the wound will heal in forty-eight hours—a catheter being kept in place. It is a pity the writer leaves us in ignorance whether he ever really performed or witnessed this operation. The dilatation of the sphincter to this extent, for some purpose, has been very lately advised and practised as a novel procedure.

It is claimed in this surgical report that wounds heal with unusual rapidity and ease in Colorado. A larger number unite by first intention, fewer become gangrenous, and suppuration, when it occurs, is rapid and healthy. This claim, if substantiated, promises a brilliant future for Colorado surgery.

A report on Materia Medica would be more valuable if it treated of vegetable remedies peculiar to the locality, instead of drugs already known and studied.

We learn from another report that catarrhal troubles of the air-passages are rather frequent in this elevated region. Also, as might be expected, epistaxis, especially among persons newly arrived.

Original cases of operation for hare-lip are reported by W. R. WHITEHEAD, M.D. A curious case is described in which supposed fissure of the anus proved, after ether had been administered, to be only an impacted fragment of egg-shell. An attempt to establish a permanent supra-pubic opening into the bladder resulted fatally in fourteen days.

A brief paper by Dr. GEHRUNG points out the advantages of the climate for consumptives. Dryness, cool summer nights, the brilliant sunlight, the temptation to be much in the open air—resulting from the fine weather and the magnificent scenery—are some of these. It is clearly stated, however, that a tolerably vigorous digestive apparatus is essential to the recovery of the consumptive in Colorado. Without this the patient should stay at home. Some very sensible hints as to treatment are appended.

A case is reported by Dr. H. J. PRATT, in which ascites from "chronic Bright's disease" in a child of three years is stated to have been greatly relieved by the constant galvanic current, applied for ten minutes daily. Paracentesis had been performed several times—latterly at an interval of only three days—and the patient was failing. Under the use of a current from eight or twelve cells, directed from front to back, and from side to side, the child's strength improved, and tapping was deferred until three weeks had passed. Afterwards, galvanism being continued, the dropsy gradually lessened. At last the abdomen and limbs became nearly natural in size, though treatment was used only tri-weekly. Albumen and hyaline casts still appeared in the urine, though the child was active and playful.

A few other papers are included in this little volume which call for no notice. While some of its contents are not of especial value, we are glad to notice and heartily commend the entire absence of "fine writing." Noticing the expression of the publishing committee, implying selection of such papers as seemed most worthy, we thank them most heartily for their fearless honesty; for we are certain, from experience and observation, that they must have mortally offended many would-be contributors. We are sorry, however, to see that the proof-reading, if done at all, was not done by a physician.

B. L. R.

ART. XXIV.—*Reports of State Boards of Health.*

1. *Fifth Annual Report of the State Board of Health of Massachusetts.* 1874. 8vo. pp. 550. Boston, 1874.
2. *Second Biennial Report of the State Board of Health of California.* From 1871 to 1873. 8vo. pp. 235. Sacramento, 1873.
3. *First Annual Report of the State Board of Health of Michigan.* For 1873. 8vo. pp. 101. Lansing, 1874.

1. WE have formerly noticed at considerable length several preceding *Health Reports of Massachusetts.* If we deal more briefly with the one for 1873 it

will not be owing to any diminished value or interest. Were the mine less rich we could more readily display its treasures. The same great ability and sound judgment heretofore characterizing the work of the Board are still amply manifested. The student of social science and public hygiene will find nearly every essay, statement, and suggestion worthy of careful attention.

The President, Dr. Bowditch, contributes an essay entitled, *Preventive Medicine and the Physician of the Future.* Believing that it will more and more become the chief aim and function of the physician to avert disease, to remove or to hold in check its causes, the writer illustrates what he thinks should be, and in the future will be, the course of a medical man, by a hypothetical case. Assuming that a young couple, hereditarily inclined to phthisis, have a child born to them, he points out the entire conduct of life which the physician of the future will counsel the parents to enforce and the offspring to follow. Printed by itself, this little tract might serve an admirable purpose as a guide to parents all over the country in the rearing of children. Though especially suited to cases where phthisis is to be feared, the great majority of its suggestions are generally applicable and excellent.

A paper *On the Present Condition of Certain Rivers of Massachusetts* continues an investigation already reported upon at considerable length in a preceding volume. As an example of the accuracy and care with which all the work of this Board is performed, we notice that the analyses of the Merrimack water are from some fifty samples taken, at different seasons, at a dozen different localities, by Prof. Nichols with his own hand.

Attention is directed by the writer to the dangerous fallacy of assuming the wholesomeness of river-water whenever chemical tests reveal no noxious matter. Cholera excreta may effectually poison water even while wholly undiscoverable by analysis; and it is nearly certain that other injurious substances, in amount too small for detection, may yet cause disease.

The use of river-water for city supplies, and the comparative purity of different streams, are fully discussed.

We are pleased to observe Prof. Nichols's statement that most of the many hundred analyses required in this research were made by a woman, Miss E. H. Swallow. His expression of confidence in the accuracy of her work—being a man not given to extravagant utterances—is high praise, and leads us to inquire whether analytical chemistry may not afford a good and profitable field for female talent and industry.

The great *Brighton Abattoir* established through the efforts of the Board in a suburb of Boston, has proved a success, and is an achievement of which these intelligent and public-spirited men may well be proud. The strict cleanliness observed, and the use of all improvements and devices for preventing and consuming offensive products, have done all that was expected. The establishment is in no way obnoxious. The accommodations afforded are being constantly increased by the addition of new buildings. Our readers may remember that the Board has power to close private slaughter-houses, rendering-houses, etc., when, and only when, they are adjudged nuisances. As fast as increasing density of population leads to such results, the proprietors are encouraged to remove their business to the Brighton abattoir. In the first six months of its use, some 17,000 neat cattle and 150,000 sheep have been there slaughtered, and all products utilized. These numbers are estimated to be, respectively, about one-third and three-fourths of the total city supply. Additions already begun will double the facilities for neat cattle. Butchers, far from being as at first reluctant, are now eager to obtain admission to the abattoir.

An illustrated description of the buildings, and the rules which govern their use, add to the practical value of this paper.

One of the most interesting and valuable essays concerning sanitary matters that we have ever read is that prepared for this report by Dr. J. F. A. ADAMS, of Pittsfield. It is entitled, *The Health of the Farmers of Massachusetts*. It is in part founded on and made up of the answers received from physicians in the rural districts to a circular containing a score of questions relating to all influences and circumstances connected with the health of farmers and their families. It shows, however, on the part of the writer a thorough personal knowledge and much reflection, as to New England country life. The practical conclusion is, that though farmers are as long-lived as any other class, they are subjected to many preventible causes of disease. Bad cookery and deficiency of fresh meat; dampness of location, with ill-drained cellars, and bedrooms on the ground-floor; improper disposal of kitchen refuse, dirty water, and fæcal matters, with frequent proximity of drinking well to sources of pollution—these are named as prominent causes of ill health. Want of recreation, too, is considered to have some effect. The writer also believes that the general use of feather beds in country families has a most pernicious influence. First, however, among all harmful circumstances, especially upon the farmers' wives, he places overwork and exposure. Too often a mistaken economy or a false pride, and a wish to be thought "smart," leads to the wife of the farmer performing the whole labour of her house, with part of that of the dairy and poultry-yard. In winter the bedrooms are usually wholly unwarmed, as indeed is every room except the kitchen and the sitting-room, which is tolerably sure to be suffocatingly close and hot from its air-tight stove. For the men, danger arises from the excessive exertions required or prompted by the pressure of work at certain seasons. Too little care is used to avoid getting chilled after being heated by exhausting labour. The influence upon offspring of the mother's continued hard work during pregnancy and lactation is also noticed.

Dr. J. BAXTER UPHAM contributes a paper containing the principal facts concerning the *Epidemic Prevalence of Cerebro-spinal Meningitis*. Over five hundred cases were reported to him. The mortality was about forty-four per cent. The number of males attacked slightly predominated. As to causation, Dr. Upham attaches chief importance to some occult atmospheric influence.

Dr. DERBY contributes a paper on *Hospitals*, which is both very sensible and very timely. Thoroughly recognizing the evils now laid to their charge, he declares that the time has come for a radical change in our modes of construction, whereby these evils shall be corrected, or at least reduced to their lowest possible degree. While for the most part concurring with him, there are a few points in regard to which, it appears to us, his views are scarcely supported by the results of observation or the testimony of men qualified to judge. The importance of the subject will warrant a brief examination of these points.

Dr. Derby declares emphatically that hospitals should be built one story high, and no more. Now, though quite as averse as he is to buildings of three stories, we are yet not quite sure that single storied structures are on the whole the best adapted to the purposes designed. The cost of construction is greater; and the expense of warming, as well as of ventilation, if an efficient system be adopted, is much larger. True, outlay must be disregarded if required for the best hygienic effects; but it does not appear that two stories are so clearly objectionable that we must insist upon a condition calculated to check the multiplication of hospitals. On the contrary, we are inclined to believe that

with two stories we avoid the objections lying against the single and against the three-story arrangement, while securing all the advantages of both.

In the matter of ventilation, Dr. Derby would find it hard to maintain his position in the face of what has been already accomplished. "All systems," he says, "of supplying the needed amounts of fresh air to hospitals of more than one story have failed. The most elaborate contrivances do not meet this fundamental want." We are not aware that many of our general hospitals have been provided with the most approved methods of ventilation. As to the ventilation of the City Hospital at Boston by one of these artificial contrivances, referred to by the writer as a "failure," we are surprised that any one should consider it as other than a most bungling device. It is a curious fact that in the ventilation of our general hospitals, and in those of England as well, we find less recognition of established scientific principles than we do in penitentiaries and insane asylums. More than thirty years ago there was introduced into the prison at Pentonville, near London, a plan for ventilating into a tall chimney, heated to create a current. The success of it was doubted by no one. In most of the hospitals for the insane in this country, the renewal of the air is promoted by some artificial aid, such as fans, or tall chimneys, or steam coils; and we have heard but one opinion respecting the result. There is indeed no mystery about the matter. The laws of pneumatics are as fixed and as well known as those of any other science. In the attempt practically to apply these laws, ignorant builders, it is true, often fail of success by neglect of some essential condition. In the hospital at Taunton, Mass., for instance, the foul air flues are all led into the boiler chimney, which was too short even to procure enough draft for the boilers alone. It certainly is not very complimentary to the mechanical ingenuity of our time, to suppose that we are incompetent to make any effective improvement upon the natural methods of ventilation. The experience already referred to, however, shows that the object has been most satisfactorily accomplished. Indeed, we are amply warranted in saying that any hospital unprovided with efficient artificial means for changing its air, is behind the age. We are consequently much surprised that, in Dr. Derby's single, brief paragraph, on the ventilation of hospitals, he alludes to artificial methods only to condemn them, and is contented to rely on the primitive agency of doors and windows. This is equivalent to a total abandonment of ventilation during weather cold enough to necessitate closure of these but not cold enough to demand fires. Upon this matter, in the construction of hospitals, too much stress can scarcely be laid, since it, more than anything else, will determine the measure of their success. Building committees are always but too ready to catch at any excuse for rejecting arrangements that add to the expense. Medical men, therefore, when consulted by them, should be very cautious how they undervalue alleged improvements in a matter of such importance as that of ventilation. Better service would be done by giving to the proposed methods an intelligent examination, ascertaining the conditions on which depend their effective action or their failure, and then insisting upon the adoption of that plan which promises the best results.

We wish that Dr. Derby had taken occasion to refer to tent hospitals. In reducing the mortality after operations, and in promoting the comfort and hastening the recovery of patients, their superiority to permanent buildings was clearly shown during our late civil war. Indeed we have yet to meet with the first physician who was in the service, who did not have the most favourable impressions concerning them. They were used to some extent last summer in connection with the City Hospital in Boston, greatly to the satisfaction, we

have understood, of the medical staff. In view of this and other recorded experience, we are warranted in saying that tent hospitals[1] constitute an invaluable improvement in our means of treating the sick and wounded during warm weather, and that therefore they should enter into the plans and arrangements of every general hospital hereafter built.

We have said that this paper is timely, because hospitals are now multiplying among us much faster than at any previous period. It will probably not be very long before every town of thirty or forty thousand inhabitants—at least in some parts of our country—will have its general hospital. It is therefore highly important that the public should be furnished with correct ideas respecting their construction. It is truly lamentable to see costly establishments recently erected, entirely destitute of improvements sanctioned by the highest authorities, and even violating in some of their arrangements the first principles of sanitary science.

The Political Economy of Health is the title of an article by Dr. EDWARD JARVIS. As might be expected from the ability and special experience of the writer, we find here a forcible exposition of the policy or economy—viewed from a purely financial stand-point—of all legislation leading to the preservation of life and health. The methods by which governments may labour for the attainment of this object are also clearly set forth. Dr. Jarvis's arguments to prove the true economy of prompt and proper care of the insane, and of all other measures which will diminish illness and prolong the capacity for work, must convince all but the extremely short-sighted.

School Hygiene is the subject of a paper by Dr. FREDERICK WINSOR. Collecting, after the method so largely used by this Board, views, facts, opinions, and answers to a series of interrogatories, from all parts of the State, the writer has produced a deeply interesting and most suggestive essay. There is unfortunately no room for doubt that our schools are not, from material, intellectual, or moral points of view, at all what they ought to be, in order to allow and promote healthful development of the bodies and minds of youth. The subject is far too wide for consideration here. We wish every teacher, every parent, every architect and builder of school-houses, and every committee-man—if by good luck the latter be intelligent enough to understand it—could read this excellent article.

For the assistance of towns about organizing local health-boards, and for newly appointed officers, Dr. AZEL AMES, Jr., gives a clear and practical account of the organization, regulations, and *Work of Local Boards of Health*.

The common and increasing *use of Zinced or Galvanized Iron for the Storage and Conveyance of Drinking Water*, led the Board to inquire whether any harmful results followed the use of water thus carried. Dr. BOARDMAN, after careful investigation, finds no reasonable ground to believe that the minute amounts of zinc taken up by the water are otherwise than perfectly harmless.

2. *The Second Report of the State Board of Health of California* can scarcely bear comparison with those of some older States. It requires almost a special education to make figures tell the truth; and it certainly requires a well disciplined mind to deduce and exhibit the lessons taught. The essays on various subjects are not distinguished by particular ability or merit. In the one or two papers to which we freely concede originality the novelty is not of a sort to be commended.

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[1] In a notice of the *Life of Dr. John Warren*, in the last number of this Journal, we directed attention to successful use of tents and rude log huts for hospital purposes during our Revolution.

The Board sets forth the importance of popularizing sanitary knowledge, and recommends the endowment of a professorship in the State University, and a bureau in the general government for the diffusion of information concerning the public health.

It is claimed that San Francisco is the healthiest great city in the world, and that the State of California fully deserves its high repute as a healthful residence. Without disputing the truth of the conclusions, we yet believe that the materials for accurate inferences are not yet provided. As yet the statistics are not so full and accurate, nor the compilers so skilled and experienced in their difficult task, as to command entire confidence.

The volume includes reports of the condition and working of the various State charities.

A member of the Board submits a scheme for the creation of *probationary asylums* for the immediate reception of persons alleged to be insane. One of these he thinks should exist in each large city. The writer states, with much force and cogency, the causes which too often prevent early resort to the curative agencies of the State hospitals. The distance is frequently very great; the true character of the disease may be in some doubt; the friends may anticipate death or speedy recovery at home; but above all, and adding force to all other reasons, is the difficulty, expense, danger, and publicity which the law attaches to all commitments of the insane to the hospitals. Nominally designed to protect individual liberty, the legal provisions are admirably adopted to deprive of the advantages of early hospital treatment all patients not palpably maniacal. We would naturally suppose that one who appreciated the difficulties and evils as the writer appears to do, would recommend a radical modification of the existing law as to admission to insane hospitals. Instead, however, of such simple methods, we have this somewhat cumbersome device of probationary asylums,—half-way houses on the road to chronic lunacy. To these our author would make admission perfectly easy, apparently requiring no formalities whatever. Detention here can last, however, only ninety days. Here, if longer treatment is desired by friends or others, the ordinary legal examination must be made, and then the patient either released or transferred to a State hospital. The officers of such asylums are also to serve as experts at the call of the courts, and to hold for observation persons pleading insanity as excuse for crime.

The originator of this precious scheme thinks it will cure most genuine cases without further treatment. False imprisonment, too, is prevented: the three months, we suppose, do not count. In some mysterious manner, moreover, it is to save families from the stigma of hereditary insanity, since the probationers are not *declared* or *convicted* as insane.

That the annoying publicity and onerous expense necessitated by existing laws before an insane man can be treated, should suggest some method of evasion is a significant comment on their wisdom. The proposal before us, however, seems to us a mortifying example of ignorance. Very many recent cases might be convalescent after three months' judicious treatment, if knowledge of their probationary position did not prevent; few would be in a condition to be safely discharged; and none could be subjected to the excitement of a trial, hearing evidence of friends and physicians and inflammatory appeals of counsel, perhaps resulting in formal judicial decision of their insanity, with sentence to confinement, no longer probationary, in a distant hospital, without terrible risk of relapse, or aggravation of their malady, and lessened chances of recovery. To this proposition, therefore, we must emphatically express our dissent. Let a hospital be erected near every large city, if possible,

and do not keep patients out of it by absurd and outrageous laws forbidding friends to care for their own sick, but for humanity's sake let us be spared this probationary monstrosity.

A Report upon Insanity and its Jurisprudence, prepared at the request of the Board, contains much that is very objectionable, and calmly sweeps aside the well-settled teachings of all the men who have made these matters their life-long study. Partial insanity, we are told, is attended with disease of only one side of the brain. In "dementia or idiocy" (using the terms as synonymous), both sides are affected. Delirium is due to over-oxidation of ganglionic cells from excess of arterial blood. Acute mania is described as the condition in which inflammation of the brain follows "a previous deranged state of the mind." After much richness of this sort in the way of general instruction, the reader is supposed to be prepared to appreciate the writer's own cases of insanity. These, to the number of five, are therefore given. All recovered, and with such wonderful celerity as to fully warrant the triumphant demand of the author why hospital physicians do not go and do likewise, or, as he puts it, "come up to the present state of scientific knowledge." This so advanced treatment consisted in purgation, bleedings, mercurials, and vaginal injections.

Choice comments on the case of Mrs. Laura Fair, and a critical consideration as to the degree of censure due to a lover who kills a jilting sweetheart, illustrate the breadth and depth of our author's thought on the subject.

Several essays on practical subjects are appended to this volume, which, though not pretending to much originality or to great thoroughness of treatment, are yet adapted to the diffusion of useful information on sanitary matters. The mineral and thermal springs of the State, accidents and explosions in mines, animal food, adulterations, sewerage, and the hygiene of the teeth, are among the subjects thus presented. The laws of the State bearing on hygiene are also printed.

3. A considerable portion of the *First Annual Report of the State Board of Health of Michigan* is taken up with the details of organization and the means adopted to obtain in the future sanitary information from all parts of the State. Unlike the report just noticed, this one has several truly admirable essays on practical subjects. The paper on *illuminating oils* exposes the inadequacy of certain State laws, especially as recently modified in the interest of dealers in these deadly fluids. The insufficiency of the inspection as provided by law, and the practical non-conformity to legal provisions, the terribly dangerous character of many oils freely sold, and the unprincipled charlatanry exhibited in the vending of recipes to make them unexplosive, all are clearly shown and forcibly illustrated. Proper methods of determining the safety of these oils are carefully described.

Wall papers, tags, labels, and confectioners' wrappers, coloured with arsenical green pigments, have here, as in Massachusetts, been proved to produce poisonous effects.

A paper of some thirty pages upon the *Hygiene of School Buildings* is perhaps the most important here published. Warmth, ventilation, light, number of stories, and number of scholars to be received, are all very intelligently treated. Could the principles here laid down be carefully adhered to in American schools, we should confidently anticipate a marked improvement in the health of our young people.

The three papers referred to are by the Secretary, Prof. R. C. KEDZIE, M.D., of the State Agricultural College. We congratulate the State on the possession of so excellent an officer.

B. L. R.

ART. XXV.—*Third Annual Report of the Board of Health of the Health Department of the City of New York, April* 11, 1872, *to April* 30, 1873. 8vo. pp. 349. New York: D. Appleton & Co., 1873.

THE title of this report seems sufficiently complex to indicate wheels within wheels; and yet it but faintly foreshadows the complexity of the organization which has for its professed object the preservation and improvement of the health of our great metropolis.

The Board of Health is composed of four police commissioners, four health commissioners, the health officer of the port, the Mayor, the "President," and the "Secretary." The latter officer addresses his introductory note, presenting the report, to the Mayor. In addition to the Board, as above described, we find enumerated a score of "officers of the Board," all of whom are different persons from the Board itself. The chief of these officers, the City Sanitary Inspector and Sanitary Superintendent, resigned during the year, and was succeeded by one of his subordinates.

The general Report of twenty-two pages, also addressed to the Mayor, is signed by Dr. Stephen Smith, who is one of the health commissioners. Then follows an Appendix of over three hundred pages.

Dr. Smith states that the Board is now dissolved by a recent legislative act reorganizing the city government. Without doubting that the late organization has accomplished much good, we hope its successor will be enabled to do yet more. The difficulty has been to enforce the recommendations of the health officers. Causes of disease may be clearly pointed out, and shown to be removable; but comparatively little benefit results unless power exists to compel preventive action.

The year 1872 was characterized by a mortality in the city one-sixth larger than that of its predecessor. The terrible heat of the week ending July 6, and the epidemic prevalence of cerebro-spinal meningitis and variola, were the chief causes of this increase.

Efforts to prevent the throwing of ashes and garbage into the streets, and to secure the separate removal of these, have not proved successful. The courts did not support the attempts of the officers to secure convictions for the violation of city ordinances.

A good work has been continued in the draining of low districts at the upper part of the city. The Board have power to order such work to be done wherever they shall deem it necessary to the health of the neighbourhood.

The presence of slaughter-houses and rendering establishments continues to be a serious annoyance and injury in many regions.

Some relief from the disgusting and hurtful emanations from the contents of privies undergoing removal has this year been secured by enforcing an ordinance compelling the use of pumps with air-tight hose and close carts. The cold of winter, however, preventing this operation, led to such accumulation by spring as to demand the speediest possible removal. The air-tight apparatus available not being sufficient for the exigency, the Board were obliged to allow a temporary return to the old methods.

Some excellent rules for the purification of street cars seem to have proved practically inoperative. They prohibit cushions, straw, and carriage of dirty clothes or bedding elsewhere than on front platform. Such regulations should be made and enforced in all large cities.

Public urinals are a convenience which our people have been strangely and

culpably slow to demand from the authorities of all great cities. Much suffering and much disease have undoubtedly resulted from the lack of such facilities. Other large cities should at once follow the example of New York in their establishment.

Life-saving apparatus, accessible to the police, along the river fronts, for use when persons are in danger of drowning, is also an admirable institution which might well be copied.

In the report of the City Sanitary Inspector, which begins the Appendix, we find the old complaint as to the want of proper support by the courts. Offenders against the most important sanitary regulations are constantly allowed to escape the penalties properly due to their misdeeds.

In a score of brief reports from district inspectors we find many interesting facts and good suggestions concerning the sanitary conditions of their respective localities. The number of cellar tenements has been much diminished. Their complete abolition is recommended. Privies, especially in connection with tenement-houses, continue to be a source of anxiety to the inspectors. Very great improvement has been made, however, in many hundred cases, by the introduction of a ventilating pipe or shaft, usually of galvanized iron six or eight inches in diameter, extending from the vaults up to a point somewhat above the roof, and terminating in a turn-cap, to create a draft. Believing, as we do, that none of these caps can be serviceable in a calm, we should like to see more stress laid on the importance of placing these flues in or against the chimney-stack. It is encouraging to learn that landlords are beginning to introduce this improvement voluntarily, and that tenants give preference to houses thus provided. One inspector believes ordinary privies, thus ventilated, superior in practice to water-closets with sewer connections. However great may be the theoretical advantages of the latter, they are nullified by the tendency to become obstructed through improper use and insufficient flushing.

The difficulties in the way of prompt and cleanly removal of ashes and garbage are spoken of by all as one of the grand obstacles to general neatness and purity. Another obstacle, consisting in the terrible filth of the streets, has been appreciably lessened of late since street cleaning has been done by the police department.

From one district, formerly very damp, comes striking testimony to the benefit resulting from the thorough under-drainage ordered by the Board. Where scarcely a family formerly escaped malarial disease, and often four or five members of one household were ill together, now a case is rarely heard of.

The improper construction and the over-crowding of the public schools is a subject of serious complaint.

The chemist of the Board makes a valuable suggestion as to the use, as disinfectants, of certain waste products, from various manufactories, and from the galvanic batteries of the police and fire telegraphs.

From the Bureau of Records again proceed bitter complaints against clergymen for their culpable neglect to make returns of marriages. While births annually recorded have increased in five years from 13,947 to 22,068, the marriages have changed only from 8,695 to 8,954!

The mortality for the year 1872 was, as we before stated, high throughout. In addition to the special causes mentioned there seems to have been an unusually fatal prevalence of the ordinary diseases of the seasons. The most striking fact, however, is the terrible mortality of the "hot week." The deaths on the seven days ending July 6, numbered 1591, against 807 of the previous week. Of the former, 733 were infants under a year old. Some two hundred other deaths could be attributed only to the extreme heat. A chart

is presented to exhibit the relations of these last to the mean temperature, highest in sun and highest in shade, mean barometer, and mean humidity, for each day of this remarkable period. Much moisture in the air seems to have increased decidedly the fatal influence of solar heat.

The mortality tables for the year are extremely minute and elaborate. By two magnificent coloured charts, there are shown for every day in the year the relations of the total number of deaths, and of the numbers caused by phthisical, by zymotic, and by diarrhœal affections, to daily mean temperature and daily range, to weekly mean of barometer, to daily humidity, and to daily rain-fall.

The death-rate for 1872, estimating the population at one million, is 32.6 per thousand inhabitants. As compared to figures as given by cities here and abroad, this is high for a place in the northern temperate zone. But the innumerable sources of error deprive these comparisons of much value except in the individual cases where we know the data to be trustworthy. Providence, R. I., has for years possessed an admirable registration; and her death-rate is only 22.1. There, however, the topography of the place prevents the necessary crowding of the population which occurs in New York and in Boston, where the rate is 30.5. We doubt the correctness of the rates assigned to St. Louis, 20.1; and to Cincinnati, 20.5; and to Buffalo, 17.3. If these and similar figures from many cities can be shown to be nearly correct, their sanitary measures should be carefully copied.

Tables exhibiting mortality from special diseases in different wards and public institutions; from intemperance in different races, ages, and in different manners; from cancerous affections, according to sex, age, race, and organ; from phthisis, under like variety of conditions—these and several others present the grim facts under many aspects.

Tables exhibiting facts concerning marriages and births require no comment beyond that already made.

An investigation into the recent wide-spread disease among horses was made by order of this Board. The result is here given in a long paper embodying a *resumé* of facts as to former epizoötics; the history of the appearance and spread of the one recently among us; statistics of mortality in the New York stables; description of the disease as there observed; results of examination of blood, urine, mucus, and other fluids, and of *post-mortem* appearances. The paper is illustrated by six handsome coloured lithographs of morbid appearances.

The writer regards the disease as the exact counterpart to epidemic influenza. While admitting that the simultaneous seizure of horses all over the city did not arise from contagion, the writer yet maintains that it spread from city to city, and State to State, solely and uniformly through the transportation of the poison by a diseased subject. Thus it would seem that he believes some occult atmospheric condition to be necessary to the prevalence of the disease, yet not of itself able to originate it; for he says that strict quarantine inevitably protects. In other words, contagion is necessary, while yet in a given city or stable the spread of the disease confessedly outruns the possibility of contagion.

Some inquiries as to adulterations have been made during this year. Previous examinations having shown lump and brown sugars to be pure, the observations were now extended to powdered white sugars. Over a hundred samples were examined without discovering any other contamination than dirt from exposure to air and dust. "Salæratus," so called, is now as often the bicarbonate of soda as it is of potash; and the former salt is not chemically

pure. Practically, however, very little adulteration was detected. Out of 28 samples, one was mixed with flour and another with *terra alba*, or sulphate of lime. Cream-tartar, however, was uniformly adulterated with the white earth, to the extent generally of more than 50 per cent., and in one case to that of 86 per cent.! Baking powders, of mixed salts, were found to be effective and properly made. These are believed to be safer for the consumer than the extemporaneous mixture of the salts as usually obtainable.

In confectionery, the examiner believes arsenical green colourings to be obsolete. Yellows, and orange tints, however, are often due to lead salts. Gypsum is much used to obtain bulk and weight cheaply, and is a reprehensible and injurious ingredient.

Some very interesting observations on the quality of the air in public buildings, schools, prisons, factories, etc., are absolutely startling in their revelations of the prevailing ignorance and inappreciation of the whole subject of ventilation. Some good suggestions are here offered upon the need and means of providing school-houses with fresh and warm air.

An inspector charged with the examination of inhabited cellars reports them as peculiarly bad, and strongly recommends that they be no longer tolerated at all.

Respecting influence of trades and handicrafts upon health, nothing new is elicited, unless it be some facts indicating that young girls working in tobacco factories are retarded in their development.

A special report on school buildings is very sad reading. Taken in connection with the experiments on air in public buildings, it reveals a terrible source of debility, arrested development, disease, and suffering. Of schools, the writer says "not one has proper and adequate means for thorough and perfect ventilation." One basement room, without cellar, has one hundred pupils, with only one window, looking on a three story building eight feet distant. So crowded are the rooms as to furnish only from sixty down to forty cubic feet of space to each pupil. This, we need not remark, is shamefully inadequate. From 600 to 1200 cubic feet per patient, with frequent renewal, is the air space usually considered essential in hospitals. The amount of perfectly fresh air which ought to be supplied to each pair of human lungs is variously estimated at from 2½ up to 20 cubic feet *per minute*. Fancy then the condition and the prospects of these wretched children, breathing their pitiful two cubic yards of tainted atmosphere over and over again, say some two or three thousand times! Flues, built in the side walls are, as the writer correctly states, utterly useless, unless some efficient means of creating a draft in them is devised and kept in operation. The recommendations of the writer, though tending towards improvement, are yet very inadequate.

As if the carbonic acid, and the animal exhalations, from the lungs and bodies of the pupils were not bad enough, we are told that privies and urinals are of the worst construction and of improper location. The walls and ceilings, also, are generally filthy.

As another sad instance of the public ignorance and neglect of the laws of health regarding the air we breathe, we have a brief but most suggestive report upon the city prison known as "The Tombs." Four prisoners occupy each cell of 726 cubic feet, intended for one. The system of ventilation, as explained, and illustrated by diagrams, is a perfect example of "how not to do it." The warming is inadequate, and at expense of purity of air. The walls are damp, giving the cells an atmosphere of a vault-like and musty smell. The pipes carrying away excrement from each cell are untrapped, and open into a gently sloping soil-pipe which runs around each tier of cells. All open into

a single discharge-pipe leading to the sewer. There are no traps, in the whole system. Gases from the sewers pass freely into the cells. Malicious or accidental obstructions, originating from one cell, occasion overflow of filth in the cells behind it, and require considerable time and labour for their discovery and removal.

A very carefully written paper by R. W. Taylor, M.D., considers the question whether syphilitic infection has been or may be propagated by the Jewish rite of circumcision. The conclusion is that, in the cases reported, some were not syphilitic, and another was otherwise caused. The possibility of communicating infection by the operation is acknowledged. Certain parts of the procedure, as sometimes conducted, are recommended to be modified.

In closing our notice of this valuable publication, we would suggest that a good, analytical table of contents, in addition to the index, would add much to the usefulness of the work. As it is, we are obliged to turn over all the pages to discover the subjects treated. The volume is well printed, well bound, and apparently carefully compiled. The charts, which in this as in the preceding number are a prominent feature, are admirably executed. B. L. R.

ART. XXVI.—*The Toner Lectures, instituted to Encourage the Discovery of New Truths for the Advancement of Medicine.* Lecture I.—*On the Structure of Cancerous Tumours, and the Mode in which Adjacent Parts are Invaded.* By J. J. WOODWARD, Assistant Surgeon U. S. A. Delivered March 28, 1873. Washington: Smithsonian Institution. November, 1873.

THE "Toner Lectures," we learn, have been established by that public-spirited physician, Dr. John M. Toner, of Washington, D. C., who has placed in the hands of a Board of Trustees a fund "the interest of which is to be applied for at least two annual memoirs or essays relative to some branch of medical science, and containing some new truth fully established by experiment or observation."

The first of these admirably designed lectures was delivered March 28, 1873, by the well-known microscopist, Dr. J. J. Woodward, U. S. Army, on the Physiological Anatomy of Cancer, and has been published by the Smithsonian Institution in pamphlet form. The subject has been well chosen, for, apart from purely scientific interest, the vast clinical importance of cancerous growths cries aloud to the profession to search, by every means, for accurate knowledge concerning their nature and mode of development, in the hope that something useful for the sufferer and the surgeon to know may yet come out of the labours of the histologist.

The lecture opens with an historical *résumé* of the different opinions advanced by the more prominent original investigators on the subject of the histogenesis of cancerous tumours. Thus we have, first, the idea of free cell-formation advanced by the early followers of Schwann, and upheld by Rokitansky. This now exploded theory was swept away chiefly through the labours of Virchow, who, secure in the general principle of "*omnis cellula e cellulâ*," ascribed the immediate parentage of the epithelioid elements of cancer to the normal connective-tissue corpuscles of the affected part, and logically contended for the purely local origin and nature of a primary tumour, whether cancerous or otherwise. Next follow the far-reaching discoveries of

Von Recklinghausen and Cohnheim concerning the free migration of leucocytes, and the important *rôle* they play in new tissue-productions—discoveries which necessarily invalidate Virchow's notion concerning the strictly family relation, so to speak, of all new cell-forms to the original cellular elements of the affected territory. The whole subject of the histogenesis of morbid growths becomes thus opened anew; and next we have Thiersch, in 1865, claiming that epithelial cancers, at least, are derived purely from cell-multiplication of ordinary epithelium—a doctrine which Waldeyer, in 1867, extended to all cancers, finding the epithelial parents of the cells of deep-seated carcinomata in the normal gland-cells. In 1869 Köster observed that the cylindrical cell-masses of cancers anastomose freely, and in many places, at least, are covered by the peculiar endothelium of the lymph-channels, whence he inferred that the latter elements are the parents of the morbid growth. Next Classen, in 1870, boldly struck out and advanced the idea that migrated white blood-corpuscles alone are responsible for the cancerous cell-foundlings, and Dr. Woodward tells us that his own partial advocacy of the same view two years later was based upon original observations, and was made without knowledge of Classen's paper. In 1872, again, Waldeyer reviewed the whole subject, and while admitting Köster's observation of the fact that the cancer-cylinders lie in the lymph-channels, and that the small-celled infiltration of the tissues invaded by cancer is due to accumulation of migrating leucocytes, yet adhered to his original doctrine of the strictly epithelial parentage of the cancer cell-elements proper.

Such being the conflicting opinions of modern histologists, Dr. Woodward cites the fact that Billroth advocates the views of Waldeyer, and of Rindfleisch he says:—

"Rindfleisch entertains opinions more nearly allied to those of Classen. Rindfleisch admits that, perhaps, in cancers involving glands, the glandular epithelium may undergo fissiparous multiplication, and so contribute somewhat—though only, as he thinks, to a moderate extent—to the formation of the cancer-cylinders. But he thinks that a far larger part is played by migrated white blood-corpuscles, which, instead of being transformed into pus or connective-tissue, as in inflammation, accumulate in the lymphatic passages, and are metamorphosed into epithelium-like elements."

This, however, is hardly a correct statement of Rindfleisch's views, as expressed in his *Text-book of Pathological Histology*, quoted by Dr. Woodward. This author, it must be remembered, considers that there are two modes of normal growth of epithelium—one "primary," whereby the youngest and innermost cells of an epithelial layer are derived from epithelioid transformation of wandering formative cells from the underlying connective tissue, under the influence of actual contact of such cells with the epithelium-tissue itself; the other "secondary," being simply multiplication by division of the pre-existing epithelial cells. Now, all cancers are, for Rindfleisch, "abnormal effects of epithelial growth," and as such he defines and classifies them. Dividing them generally into glandular and epithelial cancers, he says of the whole group of the former, "that the new formation proceeds from the glandular epithelium, has of late been established by numerous investigations. The cells multiply by division." (*Pathological Histology*, American edition, p. 181.) Taking up, then, the varieties of glandular carcinomata, he distinctly affirms of the cells of soft cancer that "they prove themselves as the genuine offspring of the intestinal glandular plate." (*l. c.*, p. 161.) In treating of the "telangiectatic' and "sarcomatous" forms he makes no special mention of the mode of origin of their cells, and only in connection with hard cancers and epitheliomata

does he seem to consider that his "primary" mode of epithelial growth by epithelioid transformation of formative cells is largely concerned in the begetting of the cancer-elements. And even here, it must be borne in mind, such cell-genesis is simply a *mode of growth of epithelium*, since Rindfleisch carefully points out that such epithelioid transformation of formative cells from the connective tissue layer can only take place by contact with pre-existing true epithelium. And even in hard cancer he distinctly says that "the *active* behaviour of the glandular epithelium .... is and remains the peculiar source of morbid action." (*l. c.*, p. 167.) For Rindfleisch thus, as for Waldeyer, all cancers are of epithelial nature and origin, and grow after the manner of ordinary epithelial tissue, only Rindfleisch admits an epithelioid transformation of leucocytes as one factor in such normal growth. Classen, on the contrary, if we understand him aright, cuts loose entirely from the idea of cancer being *necessarily* of epithelial origin, and recognizes an independent cancerous transformation of leucocytes, whose cell-type will be epithelial if the site of the original morbid action happen to be in contiguity with normal epithelial tissue, or of the character of connective tissue, if the same site be in a tissue derived from the middle germinal layer. While, therefore, both Rindfleisch and Classen recognize the bald fact of the direct transformation of a leucocyte into a cancer-cell, their ideas of its signification, and of the general physiology of the morbid growth, are essentially different.

Dr. Woodward next proceeds to the original part of the lecture, which consists of a detailed description of the anatomy of cancer, illustrated by photomicrographs from sections of tumours, exhibited by means of a stereopticon. Searching through these anatomical details for Dr. Woodward's position on the vexed question of the histogenesis of the cancer-cells, we find that, following Rindfleisch, he admits, as a matter of fact, both epithelial cell-multiplication and direct transformation of leucocytes into cancer-elements; but there he stops, declining to uphold or advance any hypothesis of the general scheme of cancer-development as a pathological process. We fully commend his caution, but at the same time we utterly fail to see how this lecture, instructive though it be to those unfamiliar with the present state of knowledge on the subject, fulfils the high requirement of the "Toner Lecture" prospectus, of "containing some *new truth fully established by experiment or observation*."

E. C.

Art. XXVII.—*On the Government of the Retreat for the Insane, at Hartford, Connecticut.* Printed for private use. Hartford, Connecticut, 1874.

We once thought that the question agitated in this pamphlet had been set at rest by the results of an abundant experience, both here and abroad. It seems to be a characteristic of our times to consider nothing as settled, and to reopen old controversies, though without the aid of additional knowledge. It is a cheap way of distinction, attractive to a certain class of minds, to revive an obsolete doctrine or practice, and invest the arguments in its favour with an air of novelty, while completely ignoring those which sealed its fate with a former generation. This is easily done, and makes the desired impression on those whose vanity is flattered by the idea that differing from the simple souls who cling to an established belief is a proof of superior wisdom. It would seem as if half the intellectual labour in the world was used in combating errors

supposed to have been killed, but rising up from time to time, refusing to stay killed.

The question with which this pamphlet is concerned is closely connected with the proper working of a very interesting class of our institutions—the hospitals for the insane. It is a fact, though its significance is but dimly seen by the outside world, that their success depends very much on the manner in which their service is organized. A hospital should be like a piece of machinery, in which every part holds certain relations to every other part, and all act harmoniously in the production of a special end. Unlike a machine, however, the forces required in the management of a hospital can be kept in their proper relations and adjusted as occasions require, only by a controlling force paramount to every other. The thing to be wrought out is definite and simple, and every movement, many and diverse as they are, all tend to its accomplishment. This being so, it is obvious that the whole establishment should be guided and controlled by a single spirit, competent to the work and responsible for the result. If the superintendent is just what he should be, the impress of his character should be seen in every direction, in every architectural arrangement, in every contrivance for occupying the attention of his patients, in every appliance for maintaining their physical powers in the best hygienic condition, and in the ways and manners of every one engaged in the service. Nothing can be more preposterous than the idea that any of the agencies employed in effecting the purposes of a hospital can be well managed by joint but independent powers. Any attempt of this kind must inevitably be followed by collisions and an imperfect result. These views are strongly confirmed by the testimony of many present and past superintendents in letters addressed to Dr. Denny in reference to the position he has taken.

The idea that more than one independent power should be employed in the executive duties of hospitals for the insane, must have arisen from the crudest conceptions of the nature of the work allotted to them, and a glance at their history abundantly shows that such is the fact. Not many years ago insanity, considered as an object of medical treatment, was regarded almost exclusively in its physical aspects, and in the little account that was made of the mental affection, the idea of depravity and unlicensed passion was more prominent than that of disease. From such views sprang the arrangements usually adopted in early times for the management of a hospital for the insane. The executive officer whose authority was paramount in the house was the steward or warden, who organized and directed the service, who ordered whatever was done or not done for the patients, excepting in the matter of drugs, and who ruled over all, sane and insane, with an autocratic hand. He might, or as is most likely, he might not, have had any knowledge of the nature or manifestations of insanity. Nor did he much need it, for the whole moral treatment, all of which was entrusted to him, consisted chiefly in imposing such restraint or punishment as the case might seem to require, while the medical treatment was prescribed by some physician of the neighbourhood, who visited the house two or three times a week and ordered the sort of medication that happened to be in vogue, such as bleeding, purgation, cold applications to the head, and shaving of the scalp, in the recent cases, with systematic purgation all around in the spring. Under such management the most frightful abuses were unavoidable. To the rude and ignorant master of the house the stormy manifestations of disease seemed to be only outbreaks of bad temper and angry passion, to be met by straight waistcoats, shower-baths, low diet, and the fiercest threats, if not blows. Luckily, the source of these evils came to be recognized at last, and the proper remedy found by a change in the organization of the service,

whereby the hospital was placed in charge of a medical man qualified by a suitable training and high professional aims, who governed the whole. He resided in the house, appointed the attendants, prescribed their duties, was conversant with all the details of the service, exacted implicit obedience to his authority, and in every arrangement had reference to the accomplishment, in the completest manner, of the special ends of the institution. Not that this change occurred at once, *per saltum*, as it were, for in most cases there was a transition period, when the steward continued to be independent in some particulars, and the managers or guardians occasionally took a turn at the executive wheel, as they do to this day at the Blockley, in Philadelphia, and at Blackwell's Island, in New York, where, for instance, they appoint and discharge attendants when some needy protegé is to be provided for. Our hospitals having come into existence towards the close of this period were, with a few exceptions, organized after the improved methods. Among the few in which some features of the old system were retained was the "Retreat," a corporate institution at Hartford, Connecticut; and though they have ever been a source of trouble and bad feelings, yet the board of managers has never been willing to recognize the entire and exclusive control of the superintendent. A year or two ago, Dr. Butler, after thirty years of faithful service, resigned, and Dr. Denny, eminently fitted by character and training for the work before him, was appointed his successor. In order to prevent a renewal of the old grievances, this gentleman endeavored to obtain from the Board of Managers such an alteration or construction of the by-laws as would give him a control paramount to and independent of every other. Failing to obtain it, he promptly resigned his charge.

The pamphlet before us is occupied chiefly with correspondence between Dr. Denny and the Board of Managers, and letters from many eminent superintendents, thoroughly sustaining him in the position he had assumed. It constitutes a valuable contribution to the cause of hospital improvement, and we hope its lessons will be carefully pondered by all who are connected with the direction of these institutions.

We do not suppose that the stand taken by Dr. Denny will be universally approved of. Some will contend that for all practical purposes he was thoroughly independent, and that it was a matter of caprice or fastidiousness to seek for control beyond his special sphere. Others, with little regard for the merits of the question, are constitutionally opposed to any one-man power, and they, of course, will not be likely to uphold him. With these it would be useless to argue, but to the former we take the opportunity to present some considerations that may have escaped their notice, for the functions of the superintendent are so peculiar that their whole breadth and scope are not readily perceived by the ordinary observer.

In the little world of which he is the head no person or thing is foreign to the single and special purpose which it is his business to accomplish—the restoration of the disordered mind. Not the cook in the kitchen, nor the farmer on the grounds, nor the mechanic in the shops, nor the engineer in charge of the boilers, should work independently of his oversight and control. And yet if the views of the Hartford managers are correct—if any of the employés could be properly placed beyond his immediate control—it might certainly be supposed to be these. But let us look a little more closely at the parts these persons have to perform in the daily economy of a hospital. No one will deny that the efficiency of a hospital depends very much on a well-ordered kitchen. Not only the present comfort and satisfaction of the patient, but his final restoration, are involved in a supply of food intelligently cooked, skilfully varied,

promptly and properly served. Work on the farm or in the shops, judiciously managed, is a restorative agency of incalculable value. The proper distribution of air and heat is scarcely surpassed by anything else, as everybody knows, in its hygienic influence. And yet in a hospital governed like the "Retreat" the Superintendent's wishes in regard to these things may be imperfectly met, if not completely frustrated, simply because the persons concerned in them are not responsible to him. If he enters the kitchen it is only on sufferance, and if his directions are followed it is only as a matter of favour, not of right. If he finds his patients when out at work are badly treated or neglected by the farm hands, his complaints may be treated as unreasonable or whimsical, and no amendment follows. If the duty of warming or ventilating the house is badly done, he may be powerless to make it any better. And the reason for all this is obvious enough. The Superintendent fails to obtain the best performance of duties of the highest importance to his success, because the persons employed for the purpose are accountable to somebody else. They look for control and direction to one who alone has the power to enforce his wishes by the strongest of arguments—summary discharge. Very likely, flagrant offences, highly improper behaviour, would be suitably noticed when reported, but this implies that the Superintendent must appeal to another for the redress of an evil which is frustrating the very object which it is his special business to accomplish. All this tends to lower him in the estimation of those around him; and by impairing the prestige of his office, his power for good is materially diminished. For let it be understood that he rules his little world with a divided empire; that in certain quarters there is a power fully equal to his own; that his word is not law in every part of it, and from that moment all true discipline departs, confidence is impaired, and his hands are crippled.

There is another aspect of the question which furnishes a conclusive argument in favour of these views. The material interests of a hospital require that there should be but one head, ordering its affairs by an intelligent appreciation of its resources and their judicious application to the various means that are employed to promote its purposes. How can such a result be expected when two heads are using those resources with little if any reference to each other? How can one appropriate money for a piece of furniture, or a carriage, or an aquarium, for the gratification of his patients, while, for anything he may know, every available means may be required by the other to pay for fancy stock, or new agricultural implements, or repairs on the kitchen? It is for the Superintendent to decide, and for him alone, between conflicting wants, and to say which shall be met at once and which postponed. Even in regard to the work on the farm, which may seem at first sight quite remote from his special sphere of duty, his supreme control may be required to direct it in the manner best calculated to promote the good of the patients. He wishes, for instance, the amplest supply of fruits, flowers, and all the delights of the garden. The steward believes that such things do not pay, and lays out for crops of mangolds and potatoes, hay and fodder. The one believes the farm should furnish an abundant supply of milk as a thing eminently conducive to economy and good health. The other prefers to turn his crops into some other shape. We might multiply these illustrations of the necessity of a supreme undivided control on the part of the Superintendent, responsible of course to the Managers; but if these are not sufficient to convince every fair-minded man, it would be useless to mention any more, and here we leave the subject, relying on the good sense of our readers to lead them to a just conclusion.

We cannot forego the opportunity to render to Dr. Denny our thanks for this noble vindication of the right and true; and in saying this we express, we

doubt not, the sentiment of the profession at large. Such devotion to a principle, involving as it did the sacrifice of a valuable appointment, will be held in grateful remembrance as long as any respect shall remain for elevated aims, an honourable ambition, and a triumph over mean and mercenary considerations.

I. R.

ART. XXVIII.—*Lectures on the Diseases of Infancy and Childhood.* By CHARLES WEST, M.D., F.R.C.P., Physician to the Hospital for Sick Children. Fifth American from the Sixth revised and enlarged English edition. 8vo. pp. 678. Philadelphia: Henry C. Lea, 1874.

THIS book represents the experience of one who has been peculiarly fortunate in having an extensive hospital and private practice in children's diseases, extending through more than a quarter of a century, and whose clinical deductions are confirmed by the records of nearly 2000 cases and 600 post-mortem examinations. Knowing this, it is with increased interest that we turn to a new edition of it to learn what influence changes in medical opinion have exerted upon the author's practice.

Although we find Dr. West is unwilling to believe that all his former observations were erroneous, and that his old faith was entirely misplaced, yet he frankly acknowledges that his practice now differs much from what it was a quarter of a century ago; that he depletes less, that he has less faith in mercury, that he employs antimony more rarely, that he has more confidence in Nature's powers, less reliance on his own resources. Yet he still believes that mercury possesses a peculiar and *specific* power in controlling acute inflammation of the serous membranes of the chest and abdomen; and that both acute pleurisy and acute peritonitis yield to a combination of calomel and opium more speedily than to opium alone. He believes that in severe inflammation of the mucous membrane of the large intestine—in other words, in dysentery in childhood—the part borne by mercury in its cure is at least of as much moment as that of opium, with which it is right to combine it; but the latter alone will fail when the two together will save the patient.

In laryngeal inflammation, or true croup, after the first active symptoms have subsided, Dr. West holds that mercury often plays an important part in its more chronic stages; and he still holds to the belief that in some forms of chronic non-tuberculous consolidation of the lung, recovery is expedited by the careful employment of mercurials. He does not regard mercury as of any service in acute affections of the pulmonary tissue, nor in any form of bronchitis, but still regards it as of service in acute pericarditis.

These are not the views usually taught at the present day, indeed quite the contrary are promulgated by the most recent American authors (Austin Flint, J. F. Meigs, and J. Lewis Smith), but coming from such high authority, and as the result of an extensive clinical experience, they certainly claim from us a careful and unbiassed test at the bedside.

This book contains such rich stores of clinical experience that we find ourselves well repaid in looking over its pages, particularly those concerning the treatment of diseases. In discussing the treatment of the formidable head symptoms which usher in the eruptive fevers, the author says:—

"I have of late years tried the use of the wet sheet in these cases, and with results all the more satisfactory, since they are obtained without any of that depression of the vital powers inseparable from the free abstraction of blood.

I have seen the packing in the wet sheet followed, in the course of one or two hours, by an abatement of temperature, a cessation of convulsions, and a return of consciousness, as remarkable as I have ever observed follow from even a copious bleeding, while the action of the skin has certainly been more speedily established, and the appearance of the eruption has been brought about sooner and more satisfactorily than by any other means with which I am acquainted. While, therefore, I would not say that depletion ought never to be practised, and while, if hydropathy failed, I should still have recourse to it, I no longer employ, nor should I advise that free depletion to which, in ignorance of these other means, I was accustomed to have recourse."

In cases of general febrile disturbance accompanied with excitement of the brain from whatever cause, Dr. West has seen much good result from the administration of small doses of aconite—half a minim every four hours to an infant of a year old. Hydrate of chloral is another remedy which he finds in these cases usually to act as a sedative, better even than any preparation of opium, obtaining sleep especially in those cases where wakefulness is due to restlessness, rather than to pain.

Bromide of potassium and hydrate of chloral our author esteems of great value; either alone or in combination they seem to exercise special influence in producing sleep in various disorders of the nervous system, such as spasm of the glottis in infancy, or chorea in subsequent childhood, and he finds them both free from the special risks of opium.

"They are of equal service in overcoming the persistent sleeplessness for which in delicate children it sometimes happens that no definite cause can be discovered. In cases where cerebral disease is suspected they may be given with advantage, and without obscuring the symptoms, and also in the restlessness of fever, provided the stimulating power of opium is not indicated. They do not, however, annul pain as opium does, even though they may produce sleep; the sleep is not refreshing if the actual suffering is severe when the patient awakes; and as they both tend to depress the circulation, they must not be given in cases of great exhaustion, nor, I think, when there is serious organic disease of the heart."

Dr. West also speaks of "the marvellous power in controlling convulsions" which these two drugs, either alone or combined, possess; particularly has this been observed in cases where there was no ground for suspecting organic disease, and where there were no distinct indications for treatment beyond such as were furnished by the frequent recurrence of the convulsions.

"Of the two remedies, the bromide has appeared to me the more reliable; but in order to obtain decided results from it, it needs to be given in doses larger than those which are commonly employed; as, for instance, from two to three grains every four hours for a child of one year old, and from three to five grains from the age of three to five. It it does not give earnest of good within the first thirty-six hours, there is little use in continuing it, though it may still be persevered with, with the addition of one or two grains of hydrate of chloral. The depressing effects of the bromide must not be lost sight of; and either their occurrence, or the failure of the remedy, may compel us to use chloral in similar doses, though at an interval of every six or eight, instead of every four hours. I think, however, that on the whole I have obtained the best results from the bromide every four or six hours, accompanied with a single full dose of chloral every night at bedtime."

Dr. West's testimony to the value of bromide of potassium in the treatment of epilepsy is very opportune, and we are inclined to believe that it coincides with the experience of many on this side of the Atlantic. He finds that it seldom fails within the first few days of its administration to arrest the frequency of the attacks, and now and then it has seemed entirely to prevent them; this latter result, however, he has observed more frequently in cases of persist-

ent, frequently repeated infantile convulsions than in the distinct epilepsy of childhood, though even here he has had some few apparent successes. In the great majority of cases the amendment, though very marked at first, has not entirely maintained itself; the system has after a time become habituated to the remedy, and after several augmentations of the dose, each of which has seemed to renew the old influence, he has been compelled to discontinue it in consequence of the depression of the pulse, the general loss of power, and the appearance of the peculiar pustular eruption which occasionally follows its long-continued use. In other cases the agent which at first worked wonders ceased to have any influence; the constitution tolerated the increased dose, but so did the disease; the patient continued to take the medicine, but the fits, though once controlled, returned after a time just as before.

Still, with all these drawbacks, the bromide remains the only agent which in Dr. West's hands has made the least approach to the character of a specific in the treatment of epilepsy.

"I always employ it when I can find no distinct indication to guide me. I confess that I use it empirically, for I have found no means by which to distinguish beforehand the cases where the bromide will do permanent good from the other apparently similar but much more common instances in which its influence is merely temporary."

In the chapter on chorea Dr. West rejects, for certainly sufficient reasons, the theory of embolism as the cause in all, or even a majority, of the cases of the affection, and he still places it in the same category with the majority of the convulsive affections of early life, believing that its phenomena depend on irritation, direct or indirect, of the nervous system.

The only remedy which has appeared to him to exert any specific power over the disease is the sulphate of zinc, beginning with half a grain three times a day, and increasing the dose by a grain daily, until the dose is arrived at which appears to fairly control the movements. And it is not unusual to find a remarkable tolerance of the remedy established, and as much as 10, 15, or 20 grains taken three or four times a day with perfect impunity. Dr. West has never increased the dose beyond the last amount, thinking that if three weeks' trial, at the end of which so large a dose was arrived at, produced no result, the remedy might be considered to have failed.

Since the publication of the preceding edition Dr. West has become an ardent advocate of the operation of paracentesis of the chest in cases of pleurisy, and knows of no valid arguments against it. In no single instance has he ever regretted its performance, but has often been sorry that he did not have recourse to it sooner. He thinks it should be resorted to in every case of urgent dyspnœa, accompanied with effusion into the chest, where there is reason for believing that great, even though only temporary, relief would be obtained by the evacuation of the fluid; in any case of acute pleurisy in which, however early it may be in the disease, there is fluid in quantity sufficient to modify the form of the chest or to produce displacement of the viscera, the child at the same time suffering from cough, distress, or dyspnœa. The chest ought also to be tapped even independent of those symptoms of constitutional disturbance, if the effused fluid should remain stationary for three or four days in spite of treatment; and he believes that, even though nature might eventually have accomplished the absorption of the fluid without this intervention, recovery will take place more speedily as well as more surely in consequence of the tapping.

In cases of doubt, Dr. West recommends that the diagnosis be verified by puncture of the chest with a hypodermic syringe, and in case of tapping, the trocar to be introduced in the fourth or fifth interspace, and about two inches

outside the nipple, unless there should be some special reason for choosing some other position.

The general rules given for the performance of the operation, and for the after-treatment are full and judicious. Dr. West does not, as a general rule, wash out the chest; and has not found that those iodine injections which greatly modify the secretion from a simple serous cyst have any influence on that poured out by a pyogenic membrane. But whenever the discharge is specially offensive, he washes out the pleural cavity first with warm water, and afterwards with a weak solution of iodine or carbolic acid, either of which greatly lessens any bad odour.

Dr. West is, with Dr. Fuller,[1] an earnest advocate, in the treatment of heart disease, especially in childhood, by "long-continued absolute rest in the recumbent posture for many weeks, and then for many months more none but the gentlest movements; and for a year or more the being carried up and down stairs; and for several years more no violent exertion, no running, no dancing." The strict observance of these precautions he has known to be followed by the disappearance of the signs of valvular insufficiency, by the lessening of the area of dulness, and by the complete cessation of the morbid sound which had accompanied the heart's action. Although it is confessedly difficult to have such a regime conscientiously carried out, the result, which it gives hopes of attaining, certainly demands the exertion of an effort for its accomplishment.

We have thus briefly noticed some of the principal additions to this edition, and have made several short extracts from it which serve the double purpose of giving the reader the author's views of the various subjects, and a slight idea of the very frank and attractive way in which he presents them. The book is a mirror of the author's vast clinical experience, and a careful perusal of its pages shows that he has liberally shared with his readers the advantages of his quarter of a century of practice and careful observation. I. M. H.

ART. XXIX.—*Reports of American Hospitals for the Insane.*

BELIEVING that few of our readers will look to this Journal for the statistics of every hospital, and that the simple yearly records of uneventful usefulness—precious as they are to the friends of the afflicted and honourable to their caretakers—present little matter for comment or criticism, we shall not attempt formal notice of every Report sent us, but direct attention to those only in which we find accounts of important changes or discussions of interesting questions.

1. *Pennsylvania Hospital for the Insane*, for 1873.—This report contains a full description of a new building, just finished, for which the institution is indebted to the beneficence of the late Joseph Fisher. The present is the second edifice built out of his original bequest with accumulated interest. Together, these structures form a noble monument to the giver; and, bearing his name, may, we hope, inspire others to emulate his judicious liberality.

Increased accommodation for the insane is the subject of an earnest appeal by Dr. Kirkbride. Of the need there is no question; nor of the imperative duty which it creates. Even in the best of homes, insanity, as a general thing, cannot be successfully treated. In the houses of the poor, any approach to

[1] St. George's Hospital Reports, 1870, vol v.; also No. of this Journal for Oct. 1871, p. 501.

proper care and treatment is impossible. Of the insane in almshouses and jails, we know but too well the hopeless miseries. Hospitals, especially designed for their purpose, and of sufficient capacity to shelter all, are the only proper resource. But until such accommodation is made, ample enough for the whole of this unfortunate class in the State, the hospitals are justified in giving preference to curable or recent cases. In connection with the existing deficiency of hospital capacity, Dr. Kirkbride sets forth with great force the claims of that large and worthy class who are far from rich but who have always been independent. People of this sort have an honourable horror of pauperizing their relatives. They cannot possibly afford to pay the lowest cost of maintenance in a private asylum. But they can pay, and are glad to pay, the small charges made in the State hospitals. Now, is it not monstrous to compel such persons, most of whom have paid taxes for the support of these institutions, to forego the curative, or even the custodial, privileges of a hospital, just to make room for those whose only superior claim is their pauperism? Are the occupants of jails and almshouses to be relieved to the exclusion of the independent poor? Surely we should do nothing to destroy the honest pride of the family that finds itself staggering under a burden grievous to be borne. Yet some among us would expel from our hospitals the insane whose friends pay a small amount for board, or compel them to be become paupers.

Like all his brethren in the specialty, Dr. Kirkbride earnestly deprecates the placing of insane convicts in hospitals designed for the worthy and unfortunate. Even if a building detached from the main hospital were devoted to this class, the mere proximity and the association under one name would cruelly afflict and humiliate many innocent persons, and do much to perpetuate and intensify the too prevalent tendency to consider insanity a disgrace. Moreover, insane convicts, as a class, can be confined only by buildings, appliances, and discipline suited to crime and its punishment rather than to disease and its alleviation. Until the number of insane convicts warrants the erection of a special hospital, a building or ward in one of the penal institutions should be set apart for them.

The whole of this report may be profitably read by all who would know the right in regard to recent questions and discussions in Pennsylvania relating to the insane.

2. *Western Pennsylvania Hospital*, for 1873.—The report before us exhibits the results of two different hospitals, under one general name and government. One, for the treatment of medical and surgical cases, is situated in Pittsburg; the other, exclusively for mental diseases, is in a suburb called Dixmont. The managers and superintendent of the latter strongly protest against the admixture of insane convicts with their worthy and respectable inmates. They also successfully refute charges recently made of improper motives in the selection of patients to be admitted or retained.

3. *State Hospital for the Insane at Danville*, for 1873.—The present is the first report of this noble institution. Only the centre building and a portion of each wing are as yet completed. From the full description given, we judge that the arrangements and appliances are well adapted to their object, and that the materials and workmanship are good. Dr. Schultz makes some very just and instructive remarks upon the sources of error which vitiate the statements of friends as to the causes and the duration of insanity in the patients whom they bring to the hospital. The qualifications and the merits of the immediate attendants on the insane are also well described.

4. *Butler Hospital for the Insane*, Providence, Rhode Island, for 1873.—We are glad to learn that this institution, which, like the "Pennsylvania Hospital,"

is a corporate charity, has, like the latter, recently received a munificent gift for the erection of additional wings. Alexander Duncan, Esq., a trustee from the beginning, has added another to the long catalogue of his benefactions to this hospital, by giving it $30,000 for building purposes. A condition is made that an equal sum shall be subscribed as an addition to the permanent funds. The trustees, desirous to keep step with the progress of the times, have adopted plans which when executed will afford provision for excited and violent patients, such as are equalled in few hospitals in the country, and surpassed by none. The new structure is to be called the "David Duncan Ward," to commemorate the name of a deceased son of the donor, who was himself a trustee, and a warm-hearted, generous friend of the hospital.

In this, as in most other American hospitals, many patients are received at a rate of board much less than the average cost. Even the lowest charges, however, are a heavy burden to some families. Dr. Sawyer suggests to the benevolent, the creation of a beneficiary fund, whereby persons may be assisted in the maintenance of insane relatives without that sense of degradation which attends the reception of State or town aid.

5. *Longview Asylum*, Ohio, for 1873.—In this State institution, as in nearly every one in the country, we meet the same complaint of overcrowding. The wards are so thronged as seriously to interfere with proper classification, to impede the curative work of the hospital and diminish the comfort of the patients. Obliging two or three patients to sleep in rooms designed for one, is every way most unsafe and objectionable.

Dr. Webb adverts to the evils of allowing the epileptic insane to be scattered about among other patients.

A brief but violent epidemic of cholera appeared in a detached ward occupied by negroes in July last. Nine deaths occurred.

6. *Eastern Lunatic Asylum of Virginia.*—This venerable institution celebrated its centennial in November, 1873. The report before us is principally occupied with accounts of the ceremonies of that occasion. This was the earliest hospital exclusively for the insane opened in America. In contrast to the somewhat boastful tone of some of the centennial orators, we are glad to read the manly words of Dr. Brower, telling the company that their hospital, though the oldest, is far from the best, and urging them to strive for a higher grade of excellence.

7. *Northern Hospital for the Insane*, Oshkosh, Wisconsin, for 1873.—This is the first report of a new hospital. In Wisconsin, as in other States, the increase of population and of mental disease has far exceeded that of hospital accommodation. The completed portion of the building is already badly crowded; and there are patients enough now waiting to fill the remaining wards as fast as they can be finished. Dr. Kempster asks the State to provide the hospital with proper apparatus for microscopic examinations, and for photographing the results. He believes that research of this kind is the most promising path towards a more thorough knowledge and a more successful treatment of mental disease. While we agree with Dr. K. in his views of the importance of microscopic observations in the study of mental disease, we would deprecate hasty conclusions.

8. *Willard Asylum for the Insane*, Ovid, Western New York. Reports for 1872 and 1873.—This large State establishment is designed to provide for the chronic insane, otherwise exposed to the neglect and abuses sure to afflict this class when confined in jails and poorhouses. It is both natural and proper that much regard should be given to cheapness in caring for this great and increasing

multitude. In noticing a report of the Illinois commissioners of public charities, (see No. of this Journal for April, 1872), we took occasion to deny and combat the pretensions there made in favour of small, detached buildings over the existing large, congregate hospitals under one roof. In recent additions for receiving 200 patients, the trustees of the Willard Asylum have adopted plans which, while they exhibit some of the gravest objections which we urged against the Cottage System, are yet so modified from its theoretic type, as scarcely even to pretend to any special excellence but cheapness. Upon this one merit, however, very much has been claimed; but, we believe, without just ground either in fact or theory. What then is the plan which is to provide accommodations "cheaper and more becoming," to "work a favourable revolution," and which "marks a new era"? A group of five buildings have been erected, twelve hundred feet from the central hospital. One is for administrative and general purposes, having dining-rooms (two) with kitchen and heating apparatus for the whole. The others, styled dormitories, two on each side, afford sleeping and living rooms, each for fifty male patients. Being but twelve feet apart, we fail to see here any better facilities for classification, or any greater freedom from mutual annoyance, than in the different wards of a great hospital. Nor can we perceive anything very "becoming" in the spectacle of nearly two hundred patients passing through sun, rain, snow, or sleet, thrice a day to their meals. In winter, are they to leave their warm rooms bare-headed, and lightly shod; or are hats and thick shoes to be donned three or six times every inclement day? If there be covered ways, the "detached cottages" become merely a clumsily arranged hospital for two hundred men, with medical supervision, and part of its work done at a distance of a quarter of a mile. Perhaps it is hardly fair to criticize the arrangements from other standpoints than that of cheapness; but when we find the magic words "detached cottage" used, we cannot forget that these are the shibboleth of certain would-be reformers who have claimed and promised for their pet plan very much more than economy. Hence we wish our readers to notice, in passing, that these Willard groups fulfil none of the especial good purposes elsewhere described as attainable in cottages. The windows have iron sashes and guards. The charming visions of family life are hardly realized in the assemblage of a hundred men in one dining-room; nor indeed even by fifty under one roof. The group, not each dormitory, is under the supervision, non-medical, of a "gentleman and his wife of mature years and discretion;" so that each individual's share of the humanizing influence of a kind and good woman, must be very small. No word in either report gives any support to the notion of some theorists, that a great deal more work could be got out of the inmates under the "cottage plan." In one brief paragraph it is intimated that greater content and greater liberty has prevailed in the detached than in the central edifices. But there is always a large number among the chronic insane, who can safely be allowed much liberty; and probably this class especially were placed in the new structures.

Let us now look at the one advantage which is emphatically and confidently proclaimed as attained in the Willard detached group. This is cheapness, both of original provision, and of continued maintenance. Now we maintain that this can be *possible* in detached buildings *only at the price of inferiority*. There is a cheapness which is dear in the end. Common sense and universal experience establish the fact, which is indeed an axiom, that fit and lasting buildings, with adequate and proper care and provision, can be furnished for a given number of insane more cheaply under one roof than under many. The very reports before us speak of economy as the reason why the baking and

laundry work for the entire Asylum is done at the central building, and why the four dormitories of the group have a common kitchen and heating apparatus. Why not then, instead of five edifices twelve hundred feet distant, have built a new wing, and thus saved altogether the multiplication of cooking and warming arrangements?

Nevertheless, we are told, that in point of fact the Willard group for two hundred patients has proved economical, both as to original outlay and as to maintenance. Figures are given which are supposed to prove this. Now figures may be variously handled, and, without impugning the motives of the officers, we think these, as presented, are calculated to mislead. As to first cost: the estimate is $500, obtained by dividing the cost of the group by 200, no account being taken of the share which these 200 patients have in the laundry, bake-house, and other general administrative buildings previously erected. Yet they take the $500 as the standard of comparison with the cost of large congregate hospitals built *de novo*. In fairness it should be compared only with the cost of new wings or wards to an established hospital. Thus judged, we find it considerably more expensive than additional accommodation in one or two hospitals which we happen to know about. Recent additions to the insane department of the Blockley almshouse, in Philadelphia, cost much less; and very admirable additions to the Government hospital at Washington, about the same as the Willard group. As no plans are given, and no very minute description of the kind of accommodation provided, we have little means of judging as to the real character and fitness of the provision made.

As to the cost of maintenance, we notice that the charge for board, first fixed at $2 per week, in 1865, was raised to $3, in 1872. The present actual cost per patient is estimated at $3.09 weekly, with an additional annual expenditure of $15 for clothing. We have no doubt that patients in most State hospitals cost considerably more than this. In the city asylum, at Blockley, however, the average expense has for the last three years ranged under $1.80 per week, *including clothing*. We can readily conceive that the class of patients supported at the Willard Asylum may be supposed not to require many things which add largely to the expense of a curative hospital. As to the matter of fact, whether at this low charge the inmates are not only made comfortable but surrounded by influences conducive to restoration or improvement, we are provided with no data upon which to decide. Nothing is told us as to the diet, mode of life, or occupation of the patients, except that a certain number of garments are made, and an uncertain amount of work done in the laundry, and other farm and household departments. When credit is claimed for cheap maintenance, we think some particulars ought to be given by which the reader may judge concerning the means by which it is acnieved. Certainly the annual cost of clothing does not indicate an adequate provision for patients required to go out of doors, and indeed none too much for any class.

The distance and isolation of the "group" render impossible that close and perpetual surveillance without which abuses will inevitably occur. We notice in each report, reference to attendants being discharged for ill treatment of their patients.

9. *State Lunatic Asylum*, Utica, New York.—The managers of this institution make complaint of what has become a serious interference with the discipline and usefulness of the asylum. This annoyance is the frequent summoning of the medical officers to appear as experts, before the courts. It is justly remarked that this is one of many reasons for some radical change in the methods of obtaining expert evidence.

The Utica Asylum has set an honourable example in the matter of necroscopical research. Pathological investigation, with the aid of the microscope and of photography, is made the sole duty of a competent physician.

We doubt the wisdom of including in a report intended for general readers, and the friends of patients, the history and post-mortem appearances of a score of fatal cases, as is here done. It strikes us that such details should be separately printed, and sent only to medical men and sister hospitals.

10. *State Lunatic Hospital*, Northampton, Mass.—From a perusal of this report we learn that in Massachusetts, as in Pennsylvania, the question of the disposition to be made of insane convicts has been recognized as one of great moment. The superintendents of existing State hospitals fully realize the impropriety of associating in any way the criminal insane with the innocent. Dr. Earle too, like several of his brethren in the specialty, deems it desirable to provide separate accommodation for epileptics. B. L. R.

ART. XXX.—*The Nature of Gunshot Wounds of the Abdomen and their Treatment: based on a Review of the Case of the late James Fisk, Jr., in its Medico-Legal Aspects.* By EUGENE PEUGNET, M.D., etc. 8vo. pp. 96. New York: William Wood & Co., 1874.

THIS brochure is an elaborate study of the once famous Fisk-Stokes case. The principal points of interest hinged upon the position and relations of the parties. Had Fisk occupied a less prominent position, or been less notorious as a type of the worst phase of American city life, he would have died unnoticed, while his assailant, in all probability, would have paid the price of his private vengeance upon the scaffold. That the case did not take this course, but became the subject of three separate trials in which much public interest was manifested, is a matter of history too recent to need recapitulation.

Dr. Peugnet gives an accurate account of the gunshot wounds received by Fisk, as revealed upon post-mortem examination, and while he shows that there were fourteen wounds of the peritoneum, he holds that they would not necessarily have proved fatal, had not unwarrantably large doses of morphia been administered. In the opinion of this gentleman, the stomach was so paralyzed at first, that the doses given by that organ were simply retained there unabsorbed, until upon recovery from the shock, which he maintains did take place, the whole amount was absorbed at once with fatal effect. The question may be possessed of much physiological interest, yet we think that no practical surgeon would hesitate to resort to similar doses in such a case, where, judging by the average rules of surgery and not from a few isolated and extraordinary instances of recovery, the probability of a fatal issue was so strong. The annals of medicine record cases of marvellous recovery and escape from imminent death, but such results do not make the rules upon which to base a prognosis, and were we to accept them as such, we should find ourselves at fault in at least ninety-nine cases out of a hundred.

The medical jurisprudence of the case occupies much of the volume, and consists in large part of an analysis of the medical evidence given in the first and third trials. The position of the parties, as shown by the holes in the cloak, the direction of the wounds, with many of the attendant circumstances are gone over in detail. Dr. Peugnet shows much ingenuity in reviewing the

legal mistakes committed by the counsel, and their failures to detect the weak points made by the opposition, showing himself much of that subtilty of mind which would probably make him an invaluable coach upon a similar occasion. As a whole we have in this little volume a valuable and creditable study of this case from the stand-point of a medical counsel, rather than from the graver and more responsible position of a medical expert. Yet we cannot avoid saying that it seems to us to be a mistake for medical men to dilate upon the *legal* points of a case, as the lawyers engaged do not ordinarily require any such assistance.

Our author's conclusions are that "the medical jurisprudence of the Stokes case proves that: 1. The shooting of Fisk was not done in self-defence, but with premeditation; and 2. The wound in the abdomen was not necessarily fatal, and that the morphia was the immediate cause of death. These thus proved an attempt to commit murder in the first degree."

In view of this as well as some other late *causes celebrés* Dr. Peugnet thinks, and in this few will be found to differ from him, that there is an urgent demand for a change in the manner of conducting ante- and post-mortem inquests by coroners, and a modification in the introduction of expert testimony into criminal trials. S. A.

ART. XXXI.—*A Universal Formulary: Containing the Methods of Preparing and Administering Officinal and other Medicines. The whole adapted to Physicians and Pharmaceutists.* By R. EGLESFELD GRIFFITH, M.D. Third edition, carefully revised and much enlarged, by JOHN M. MAISCH, Phar.D., Professor of Materia Medica and Botany in the Philadelphia College of Pharmacy. With illustrations. 8vo. pp. 779. Philadelphia: Henry C. Lea, 1874.

THIS work has been so long popular with both physicians and apothecaries, in this country, for its extensive and useful collection of medicinal formulæ and pharmaceutical preparations, that it is merely necessary at this time to indicate the changes made in the present edition, which has undergone the careful revision of the able Professor of Materia Medica and Botany in the Philadelphia College of Pharmacy.

All the numerous improvements in manipulations and processes which have been made since the publication of the previous edition, and all the new remedies of real merit are described by Prof. Maisch, and the work fully brought up to the present times. Such formulæ as have become obsolete are omitted, yet notwithstanding their omission, the volume has been enlarged by considerably more than one hundred pages.

It will thus be evident that the changes and additions of the present editor are most important, and must greatly increase the usefulness and popularity of the work.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

1. *Bartholow's Experiments on the Human Brain.*—Dr. FERRIER, in commenting upon Dr. Bartholow's experiments on the human brain (see No. of this Journal for April, 1874, page 505), states (*London Medical Record*, May 13, 1874) that, whatever opinion may be entertained as to their propriety, they furnish facts of great interest in relation to the physiology of the brain. The point at which the needles were inserted (the postero-parietal lobule) corresponds homologically with that region of the brain in monkeys which he, Dr. F., has shown to be a centre for the leg. In close relation to this in the ascending parietal convolution, and in the upper part of the ascending frontal in advance of the fissure of Rolando, are centres for movements of the arm and hand. The method followed by Dr. Bartholow, of pushing the needles into the brain-substance, favours diffusion of the current, so that the conjoint movements of the arm and hand may be looked upon as the simultaneous excitation of different individual centres. The results, however, are otherwise quite in accordance with what one would have reason to expect from irritation in this region. They distinctly bear out the anatomical and physiological homology of the brain of man with that of the monkey and lower animals. Owing to the depth of penetration of the needles, there is reason to believe that the stimulation reached the cerebral centres of the tactile nerves, which he has given grounds for supposing to be near this region. This would account for the tingling and painful sensations experienced in the extremities of the opposite side. Of further interest is the occurrence of epileptic convulsions from general diffusion of the irritation when the currents were intensified. This is entirely in accordance with his observations, and the phenomena of the seizure are a complete parallel to the results in the lower animal which he has elsewhere recorded. The subsequent spontaneous occurrence of epileptic convulsions and ultimate paralysis are clearly accounted for by the inflammatory changes, at first causing irritation and then proceeding to annihilation of the function of the cortical centres, without affection of the lower ganglia. Precisely the same effects are observable in the lower animals.

[We take pleasure, in justice to Prof. Bartholow, in giving place here to the following candid letter addressed by him to the Editor of the *British Medical Journal*, and which is published in the No. of that excellent periodical for May 30th, and which, as the editor remarks, "is, we believe, one which is likely to disarm further criticism."]

"SIR: A case of epithelioma exposing the brain on which I ventured to make some experiments, has excited unfavourable comment in your widely circulated Journal and elsewhere. Under these circumstances, I beg to offer

some explanations, which, whilst they do not justify the experiments in question, at least, it appears to me, put the matter in a less offensive shape.

"1. The patient was hopelessly diseased, with a rodent ulcer, which had already invaded the dura mater. The ulcer was rapidly extending, and threatened an early extinction of life.

"2. The patient consented to have the experiments made.

"3. It was believed that fine insulated needles could be introduced without injury that would affect the progress and termination of the case, for the following reasons. The brain has been incised to permit the escape of pus, a notable and successful example of which has recently occurred in London. Portions of the brain-substance have been lost, and yet the patient survived; for example, the Massachusetts case, in which a tamping-iron was driven through the brain, the patient recovering, and dying many years afterwards of another malady.

"4. The faradic current was used; and this has, as is well known, no electrolytic action.

"5. The fatal result was attributable to the progress of the epithelioma. The erosion of the skull already had existed thirteen months. The thrombus found *post-mortem* in the longitudinal sinus could not have been caused by the needles, which were introduced some distance from it on each side.

"Notwithstanding my sanguine expectations, based on the facts above stated, that small insulated needle electrodes could be introduced without injury into the cerebral substance, I now know that I was mistaken. To repeat such experiments with the knowledge we now have that injury will be done by them—although they did not cause the fatal result in my own case—would be in the highest degree criminal. I can only now express my regret that facts which I hoped would further, in some slight degree, the progress of knowledge, were obtained at the expense of some injury to the patient."

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2. *Further Researches on the Localization of Function in the Brain.*—In a paper read before the Royal Society on March 5, Dr. FERRIER gave the results of an experimental investigation, tending to prove that there is a localization of function in special regions of the cerebral hemispheres.

In a former paper published by the author in the *West Riding Lunatic Asylum Medical Reports*, vol. iii. 1873, the results were given of experiments on rabbits, cats, and dogs, made specially for the purpose of testing the theory of Dr. Hughlings Jackson, that localized and unilateral epilepsies are caused by irritation or "discharging lesions" of the gray matter of the hemispheres in the region of the corpus striatum. Besides confirming Hughlings Jackson's views, the author's researches indicated an exact localization in the hemispheres or centres of regions for the carrying out of simple and complex muscular movements of a definite character, and described by him as of a purposive or expressional nature.

Facts were also recorded tending to show that other regions of the brain were connected with sensory perception, but no localization was definitely arrived at.

Among the experiments now related are some in further confirmation and extension of those already made on cats, dogs, and rabbits, as well as a new series of experiments on other vertebrates. In particular, numerous experiments on monkeys are described, for the purpose of which the author received a grant of money from the Council of the Royal Society. In addition, the results of experiments on jackals, guinea-pigs, rats, pigeons, frogs, toads, and fishes are narrated.

The method of investigation consists in the application of the stimulus of an induced current of electricity directly to the surface of the brain in animals rendered only partially insensible during the process of exploration—complete anæsthesia annihilating all reaction. It is supplemented by the method of localized destructive lesions of the hemispheres.

Special attention is called to the precision with which a given result follows stimulation of a definite area; so much so, that, when once the brain has been accurately mapped out, the experimenter can predict with certainty the

result of stimulation of a given region or centre. The theory that the phenomena are due not to excitation of cortical centres, but to conduction of the electric currents to basal ganglia and motor tracts, is considered as disposed of by the fact of the precision and predictable characters of the results, and by the marked differences in the phenomena which are observed when regions in close local relation to each other are excited. Other facts are pointed out, bearing in the same direction; among others, the harmony and homology subsisting between the results of experiment in all the different animals.

The experiments on monkeys are first described.

Reference is made in the description to the figures of the brain, on which are delineated the position and extent of the regions, stimulation of which is followed by constant and definite results.

Generally it may be stated that the centres for the movements of the limbs are situated in the convolutions bounding the fissure of Rolando, viz., the ascending parietal convolution with its postero-parietal termination as far back as the parieto-occipital fissure, the ascending frontal, and posterior termination of the superior frontal convolution. Centres for individual movements of the limbs, hands, and feet are differentiated in these convolutions.

Further, in the ascending frontal convolution, on a level with the posterior termination of the middle frontal, are centres for certain facial muscles, *e. g.*, the zygomatic, etc. At the posterior termination of the inferior frontal convolution and corresponding part of the ascending frontal are the centres for various movements of the mouth and tongue. This is the homologue of "Broca's convolution." At the inferior angle of the intraparietal sulcus is the centre for the platysma.

In the superior frontal convolution, in advance of the centre for certain forward movements of the arm, as well as in the corresponding part of the middle frontal convolution, are areas, stimulation of which causes lateral (cross) movements of the head and eyes, and dilatation of the pupils.

The antero-frontal region, with the inferior frontal and orbital convolution, give no definite results on irritation. Extirpation of these parts causes a condition resembling dementia.

No results could be ascertained as regards the function of the central lobe or Island of Reil.

Irritation of the angular gyrus (*pli courbe*) causes certain movements of the eyeballs and pupils. Destruction of this convolution gives data for regarding it as the cerebral expansion of the optic nerve, and as such, the seat of visual perception.

The phenomena resulting from irritation of the superior temporo-sphenoidal convolution (pricking of the ear, etc.) are indications of excitation of ideas of sound. It is regarded as the cerebral termination of the auditory nerve. The sense of smell is localized in the uncinate convolution. The situation of the regions connected with sensations of taste and touch is not accurately defined, but some facts are given indicating their probable locality.

The occipital lobes do not react on stimulation. Destruction of these lobes caused no loss of sensation or voluntary motion, but an apparent abolition of the instincts of self-preservation.

The corpora striata are shown to be motor in function, and the optic thalami sensory.

Stimulation of the corpora quadrigemina causes dilatation of the pupils, opisthotonic contractions; and the utterance of peculiar cries when the *testes* alone are irritated. The nature and signification of these phenomena are regarded as still obscure, and requiring further investigation.

Some experiments have been made on the cerebellum of monkeys. They confirm the author's previous views as to the relation of this organ to coordination of the optic axes, and the maintenance of bodily equilibrium. The experiments are not detailed, as they will form the subject of a future paper.

New experiments on dogs essentially confirm those already published, while many new facts have been elicited. Those on jackals agree in the main with

the experiments on dogs, both as to the character of the results and the localization of the centres. New experiments on cats generally confirm, as well as further define, the results described by the author in his former paper. The facts of experiments on rabbits, guinea-pigs, and rats are essentially alike, and also confirm former statements.

In all those animals, the sensory regions are defined, and their position compared with those in the brain of the monkey.

The only result obtained by the stimulation of the cerebral hemispheres in pigeons was contraction of the pupil. The region associated with this action, situated in the postero-parietal aspect, is compared with a similar region in the mammalian brain, and regarded as the seat of visual perception.

Movements of the limbs in frogs, and of the tail and fins in fishes (as in swimming), can be excited from the cerebral hemispheres in these animals. Exact localization of motor and sensory centres is not possible.

The optic lobes in birds, frogs, and fishes seem related to movements of flight and progression, in addition to their relation with the eyes. Similar phenomena result from irritation of the cerebellum, but the signification of these is reserved for future inquiry.

From the data of physiological experiment, a foundation is obtained for constructing an anatomical homology of the convolutions.

Among other points in homology the fissure of Rolando is shown to be the homologue of the crucial sulcus in the brain of the carnivora.

The whole brain is considered as divided into a sensory and motor region, corresponding to their anatomical relation to the optic thalami and corpora striata, and the sensory and motor tracts.

The motor regions are regarded as essential for the execution of voluntary movements, and as the seat of a corresponding motor memory (motor ideas), the sensory region being looked upon as the organic seat of ideas derived from sensory impressions. An explanation is attempted of the phenomena of aphasia, and the relation of the memory of words to the ideas they represent.

The theory that a certain action, excited by stimulation of a certain centre, is the result of a mental conception, is considered and disputed. From the complexity of mental phenomena, and the participation in them of both motor and sensory substrata, any system of localization of mental faculies which does not take both factors into account, must be radically false. A scientific phrenology is regarded as possible.

The paper concludes with a short consideration of the relation of the basal ganglia to the hemispheres. The view is adopted that they constitute a subvoluntary or automatic sensori-motor mechanism.—*London Medical Record*, March 18, 1874.

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3. *Neuropathic Origin of Simple Hydruria (Diabetes Insipidus) from Epidemic Cerebro-spinal Meningitis, Trauma, and Syphilis.*—Professor MOSLER states that from physiological experiments it seems likely that different parts of the medulla oblongata are concerned in the production of excess of urine on the one hand, and the sugar in the urine which is the characteristic phenomenon of diabetes mellitus on the other. At least, experiment has shown that both conditions may arise from affections of the nervous centres. In the present paper the author gives some cases in which the occurrence of polyuria or diabetes insipidus is ascribed to affections of the brain. The first case was one in which after an attack of epidemic cerebro-spinal meningitis there remained increase of the quantity of urine passed. In this case the local disease had probably produced some structural change in the fourth ventricle or its neighbourhood. The second case is one in which a similar symptom resulted from a fall on the head. In this case the polyuria was probably due to hemorrhage into the fourth ventricle with rupture of the brain substance, the healing of which would leave a cicatrix. The symptom lasted 14 years, and was much benefited by large doses of acetate of lead combined with opium. The author has found acetate of lead a very efficient means of causing contraction of the vessels of the kidney, and he gives it with great advantage in catarrhal pyelitis. The third case is one of syphilis, in which polyuria was the first symptom of

syphilitic disease of the brain. There followed various other cerebral symptoms, such as epileptiform convulsions, and after death there was extensive softening in the left hemisphere, in the medulla oblongata and the pons.—*Glasgow Med. Journ.*, Jan. 1874, from *Virchow's Archiv*, July, 1873.

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4. *Changes in the Muscular Tissue, after Division of Nerves.*—Professor Bizzozero and C. Golgi were engaged in experiments having a different object when they lighted on the curious observation given in this paper. In some cases where the nerve supplying a muscle had been cut, they found that the muscular fibre had nearly or completely disappeared, while the muscle, as a whole, was even increased in size. The proper muscular tissue had been replaced by fatty tissue. This observation may be of some consequence in relation to paralysis pseudo-hypertrophica.—*Glasgow Med. Journ.*, Jan. 1874, from *Stricker's Med. Jahrbücher*, part 1, 1873.

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5. *On Diapedesis.*—Prof. J. Arnold, of Heidelburg, gives the results of a large number of experiments made on the frog's tongue, with the view to determining the mode of escape of blood-corpuscles from the vessels after obstruction of veins. He ligatured either the central or lateral veins of the tongue, and then submitted the capillaries which feed these to microscopic examination. There was, doubtless as a result of the obstruction of the vein, greatly increased pressure within the capillaries, and this seemed to manifest itself in the form of numerous minute bulgings or pouches out from the vessels. Further, he saw how the red, and (more rarely) the white blood corpuscles were made to slip through the vessels, this process of diapedesis being apparently a passive one, and due to the increased pressure in great measure. Thus he observed, how when a red blood corpuscle had got through the wall there was generally a current of fluid from the vessel through the same aperture, till it got filled again by a fresh corpuscle. But that diapedesis is passive seemed also to be shown by the fact that when finally divided vermilion was previously introduced into the circulation, it also escaped through the same channels as the red blood corpuscles. Again on injecting the vessels after death, in cases which had already been the subject of observation, with a blue coloured solution of gelatine, he found that it also escaped from the capillaries, and that often by a channel in which a blood corpuscle was sticking. Then further, when the capillaries were stained in the usual way with a silver solution, there were found to be numerous dark points and circles visible in the internal surface which were always at the borders of the endothelial plates. The circles at least were apertures through which blood corpuscles had escaped. The question arises, however, whether any openings exist in the capillaries normally, and these are only enlarged when the pressure is increased—or whether they are entirely produced by the increased pressure. The author, from his observations, concludes that there are normally in the capillaries minute apertures between the endothelium cells which he names stigmata, and that under the conditions presented they enlarge and give passage to the blood corpuscles; these enlarged stigmata he would name stomata. The second part of the paper before us is taken up with the fate of the corpuscles which have been pushed out of the vessels. As will be noticed, the escape of these corpuscles is a purely passive process, not a wandering out, and after they have left the vessels they may be carried away from them to a distance by the currents which rush through the stomata when a corpuscle leaves one for a moment empty. In their subsequent course the corpuscles are still passive. The author describes somewhat minutely how, either isolated or in groups, they gradually lose their colouring matter, and finally disintegrate. During the process of decolourization the groups of red blood corpuscles often look delusively like large colourless cells with red blood corpuscles inside it, but this the author says is not the case, and he believes the corpuscle-holding cells of some authors to be really groups of red blood corpuscles undergoing these changes. The corpuscles sometimes, though rarely, form solid pigment, either in granules or in needles. Lastly, the author has not been able to discover any other mode of disappearance of the exuded blood corpuscles than that above described. They may, however, in

part, be carried into the lymphatics, for anything he knows.—*Glasgow Med. Journ.*, Jan. 1874, from *Virchow's Archiv*, Aug. 1873.

6. *Origin of the Bile-ducts.*—At the late meeting of the German Association at Wiesbaden, Professor KUPFFER, of Kiel, described certain new points in the histology of the mammalian liver, which should prove as interesting as they are new to most anatomists. By the injection of the bile-ducts and bile-capillaries, small cavities or vacuoles may sometimes be filled within the liver-cells, which are connected with the bile-capillaries around the corresponding cells by means of excessively delicate canals. The appearance presented by a good specimen of injected liver is that of a number of small stalked buttons attached to the bile-capillaries, the stalks being, as a rule, somewhat bent. Hering, who has advanced the knowledge of the hepatic structure so considerably, has not failed to see these knobs, but believes them to be accidental extravasations within the substance of the cell. The regularity of the appearance, however, and the presence of the delicate canal of communication, support the view advanced by Kupffer. This anatomist recognizes in the intra-cellular spaces secreting vacuoles or capsules, from which the bile flows into the capillaries The liver-cells which are furnished with such vacuoles would therefore closely resemble the capsule-cells discovered and described by Kupffer in the salivary glands of some insects.—*Med. Times and Gaz.*, Feb. 14, 1874.

7. *Contributions on the Structure and Functions of the Bladder.*—According to Dr. G. JURIÉ, the arrangement of the muscular layers of the bladder and their relation to the internal sphincter urethræ are as follows: The external layer is the strongest, and it passes longitudinally from above downwards, being especially developed on the anterior and posterior surfaces. The middle layer is transverse but slightly oblique, the posterior bundles passing downwards and forwards and the anterior downwards and backwards, so that they cross somewhat. The internal layer is longitudinal but not very powerful. It is most developed at the upper end of the bladder, disappearing altogether at the level of the entrance of the ureters The powerful external longitudinal layer is in part inserted at its lower extremity into the internal sphincter, so that when it comes into action it will draw asunder the sphincter and open the orifice. This sphincter is thus relaxed, not by the pressure of the fluid but by the direct action of the longitudinal muscular layer. A further point is that the entrance of the ureters was shown to be valved not only by the oblique passage through the mucous membrane, but also by the passage through the muscular coat. When the mucous membrane was cut away, and pressure exercised on fluid in the bladder, there was no escape through the ureters. It would thus seem that the contraction of the muscular coat of the bladder has a direct influence in closing the ureters and preventing regurgitation during the emptying of the bladder.—*Glasgow Med. Journ.*, April, 1874, from *Stricker's Medizinische Jahrbücher*, Part IV., 1873.

8. *Bladder with a Pouch communicating with a Third Ureter.*—Mr. FLETCHER BEACH showed to the Pathological Society of London a case of this nature, occurring in a child aged 5 years. She had been healthy till six weeks previously, when there was a difficulty in micturition, which increased, and death ensued. *Post mortem*, a third ureter, opening below with a pouch near the bladder, filled with pus, was discovered.—*Brit. Med. Journ.*, May 16, 1874.

9. *Ovulation without Menstruation.*—M. DE SINÉTY stated at the Biological Society of Paris (25 April, 1874) that he had observed on the surface of the ovary of a woman who had died of phthisis, and who had not menstruated for five months, a ruptured Graafian vesicle. Ovulation had thus continued in the absence of menstruation.—*Revue Scientifique*, May 2, 1874.

MATERIA MEDICA, GENERAL THERAPEUTICS, AND PHARMACY.

10. *Jaborandi, a new Sudorific and Sialogogue.*—Recent French journals (*Révue Scientifique*, April 18, *L'Union Médicale*, April 14 and May 9, and *Gaz. Hebdom.*, April 10) contain notices of a new and powerful sudorific and sialagogue brought to Paris by Dr. S. Coutinho, of Pernambuco. This new therapeutic agent is the leaves of a shrub growing in Brazil, the botanical characters of which have not yet been satisfactorily established. M. Rabuteau, who has made a chemical analysis of these leaves, and experimented upon their physiological properties, failed to attain any evidence of an alkaloid in these leaves, or the presence of any organic base. The quantity of leaves furnished Mr. R. was so small that he could not carry his investigations as far as he desired, and awaits a further supply to enable him to continue them. All of the leaves which remained weighed 2.90 grammes, and these Mr. R. reduced to powder, and about 10 o'clock in the evening of the 6th April, he prepared a teacupful of an infusion of them, which he took when nearly cold; one-half of it alone, the other half with the addition of a little sugar; this addition was not, however, necessary, as the taste of the infusion was not disagreeable. Ten or fifteen minutes after he had taken the medicine, Mr. R.'s forehead became moist, and he went to bed. Sweating speedily came on, and at the same time profuse salivation, which continued for nearly two hours. There was scarcely any abnormal heat, nevertheless the temperature was highest when the effects of the medicine were most active—three-quarters of an hour after taking the infusion. After changing his wet shirt, Mr. R. slept well.

Mr. R.'s latest experiments show that the bitter substance of the jaborandi is the active sialagogue and sudorific principle; and that the sialagogue effects are most readily manifested, since they are most marked when the active principle has been taken in a very small dose; and, finally, that when the dose is larger, the sudorific effects are increased.

M. Gubler has also tried this drug at the Hôpital Beaujon, and reports that it has always acted as a powerful diaphoretic and sialagogue. Its action becomes evident a few minutes after it has been taken, and almost with certainty. Very soon after it is administered, the sweat rolls down the face and the whole surface of the body. The saliva flows in such abundance that articulation becomes almost an impossibility; as much as a pint and a half has been collected in less than two hours. At the same time the bronchial secretion has been observed to increase, and in one or two cases diarrhœa supervened. It is a remarkable fact, that the employment of heat, as M. Coutinho has remarked, has but a slight influence in the production of the sudorific effects of jaborandi. Whilst it is of paramount importance where our indigenous sudorifics are concerned, it is certainly not unavailing to administer jaborandi in a very hot infusion, and to cover the patient up warmly in bed; but these conditions are by no means necessary to develop the power of the new sudorific. Thus in one experiment, a person, who is by no means subject to sweatings, produced a copious perspiration in himself, by taking a glass of jaborandi scarcely warm, while he was going about his ordinary business. M. Gubler believes that a great future is in store for this new remedy, which he considers to be the first incontestable specimen of a diaphoretic truly worthy of the name, that is to say, of a medicament having the power of directly inducing the secretion of sweat by an elective action—by a special stimulation of the sudoriparous apparatus. The form of administration is from four to six grammes of the leaves in a cup of warm water, or if given in cold water the same results ensue.

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11. *On Eucalyptus and its Febrifuge Qualities.*—Dr. E. Burdel, Physician to the hospital at Virgon, records in the *Revue des Sciences Médicales*, April, 1874, the results of his observations on the action of eucalyptus in the Sologne.

In the note under consideration, upwards of thirty-three cases are reported, in which eucalyptus was successful in eighteen instances. M. Burdel believes

that he can now, after two years' experience, by bringing together the facts which have occurred under his observation, arrive at the following conclusions with regard to the employment of eucalyptus.

The action of this remedy, which may certainly be considered a febrifuge, is slow and far from being always constant. In mild intermittent fever, eucalyptus is successful in four-fifths of the cases; in tertian, in three-fifths only; and, finally, in quartan fevers, it almost entirely fails: that is to say, in eight-tenths of the cases. In the seasons when intermittent fever is most frequent—that is to say, endemic—relapses are much more common when eucalyptus is used than when recourse is had to quinia. Relapses may, however, be avoided by administering eucalyptus more frequently after some days' rest only, and in as large doses as the stomach will tolerate. This remedy is perfectly inert in palustral cachexia. Finally, M. Burdel believes that in the second year of his experiments he obtained a rather larger proportion of cures and a smaller number of relapses, because he gave the eucalyptus in conjunction with good wines, iron, and quinia, and kept the organism up to its work by frequently repeated doses. Dr. Burdel administered the alcoholic extract of eucalyptus in pills, each containing 15 centigrammes, to the number of from four to ten daily, according to the form of the fever, given twice during the day.—*London Med. Record*, May 13, 1874.

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12. *Action of Chloroform.*—Dr. POLLAK gives the following as his conclusions on this subject:—

1. Chloral is a very good hypnotic, and in all those diseases which consist in abnormal cerebral excitement, or are combined with this, it by its soporific influence constitutes a good calming medicine. 2. It relieves pain by the fact of inducing sleep, but will not relieve pain without causing sleep. In very intense pain it exerts but little hypnotic effect, and in such cases is advantageously combined with morphia. 3. As it induces relaxation of muscles, both voluntary and involuntary, it is an excellent means in the various forms of spasm. 4. In disease of the heart and lungs and of the digestive canal, chloral is without effect or unsuitable or even dangerous, and consequently is contraindicated, or should only be employed with caution. 5. It does not admit of being used as an anæsthetic during the execution of the great operations. 6. Its prolonged employment is not usually attended with any disagreeable effects, and if any occur, they are not of any consequence. It especially does not induce congestion of the brain or disturbance of the digestive and nutritive processes. 7. It is in most of the diseases in which it is employed an excellent palliative, but on the disease itself it usually exerts no influence. Chloral is especially indicated in the cases in which morphia is indicated, and when the latter on account of some of its effects cannot be administered. It is contraindicated in diseases of the heart and lungs and of the digestive canal. 8. Comparing chloral with morphia and chloroform, we may assert (1) that as a soporific agent its operation is more certain and less disagreeable than is that of morphia, which it will succeed in displacing as a hypnotic; (2) that it only relieves pain by inducing sleep, and fails to remove intense pain, so that as an anodyne it cannot supersede morphia; (3) and that as an anæsthetic it is far inferior to chloroform both in rapidity and intensity. 9. Although chloral has rightly obtained admission into the Materia Medica, it has not yet acquired its definitive place. Notwithstanding the numerous communications that have been made respecting it (the author is cognizant of the writings of 312 authors upon the subject), much more has yet to be worked out respecting its chemical, physiological, and therapeutical relationships before the "chloral question" can be said to be completely settled.—*Med. Times and Gazette*, April 11, from *Wiener Med. Woch.*, Feb. 28, 1874.

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13. *Studies on Ether and Chloroform.*—Dr. T. G. HAKE gives (*The Practitioner* April, 1874) an interesting account of the observations made by Prof. SCHIFF, of Florence, on the action of ether and chloroform. These observations, though instituted solely for the advancement of physiological science, have a direct practical bearing on surgical practice. Prof. S. states in his

work (*Sopra il metodo seguito negli esperimenti sugli animali viventi*): "We adopt ether and not chloroform because a very extensive experience has shown that etherization pushed to the very last stage of insensibility is never dangerous to life so long as one maintains the act of respiration. And even if one presses the inhalation of ether yet further, so that the respiratory movements cease, or, in other words, the appearance of death is complete, life is never menaced, if only at the moment of the paralysis of the thoracic walls inhalation is interrupted and a species of artificial respiration is immediately commenced by means of periodic compression of the thoracic parietes themselves.

"Chloroform has been preferred to ether because it acts more quickly, and its use is more agreeable to the patient, who dislikes the odour of ether. But chloroform has a paralyzing action much greater than that of ether, and in like manner, at least in man and the mammalia generally, has a special influence on the nerves of the heart and of the vessels. If chloroform is pushed so as to produce a considerable weakening of the respiratory movements, the interruption of the inhalation may, in a majority of cases, lead to the re-establishment of respiration and afterwards of sensation; but sometimes, a short time after the commencement of inhalation, the force of the circulation is so enfeebled that it no longer renews, fast enough, the blood in the lungs. The blood of the body no longer comes into necessary contact with the atmospheric air introduced by respiration into the lungs.

"Death is sometimes sudden, but it may be preceded more or less by signs of sinking of the pressure of the blood in the vessels. The cases in which paralysis of the circulation shows itself while respiration continues are comparatively rare, but the annals of human surgery record many examples, and we have ourselves observed some in animals. If the action of chloroform is prolonged until respiration ceases, we are not even sure of being able to revive the individual after having re-established the respiratory movements, for these often again cease owing to the disturbance of the circulation, while these same movements, if restored after the inhalation of ether, become *always* more frequent in the individual when left to himself.

"We are able to say that in the present state of science the medical man *is responsible for every case of death occasioned by the application of ether*, because a careful watching of the respiration is capable of preventing death, whilst the lethal effect of chloroform depends in part on individual predisposition which the physician is unable to recognize."

Dr. Hake states that "To explain this latter statement, it should be understood that both ether and chloroform, pushed to the last stage of their action, give rise to paralysis of the respiration, vessels, heart and motor nerves, but that ether invariably produces its effects in the order of sequence now given (life of course being sustained in all cases by artificial respiration when automatic breathing has ceased); while chloroform sometimes produces paralysis of the vessels in the first instance, then of respiration, and finally of the heart. The result of the action of chloroform is thus variable; it frequently happens that its effects manifest themselves in the same order of sequence as those of ether, only much more rapidly; and it also happens that they follow each other in an inverse order as respects the first two phenomena, paralysis of the respiration and of the vessels. It is this variable action of chloroform which the physician is unable to foresee and to provide against in individual cases, and to which the danger to life is traceable. Very often at the beginning of the inhalation of chloroform by the trachea the vessels become at once paralyzed, the pulse is insensible, and death follows rapidly with a deep inspiration. All this Professor Schiff has frequently verified by experiments on dogs and rabbits, in which during inhalation the manometer has been constantly in connection with the carotid artery.

"That the heart is the last of these three factors of life which dies, the Professor clearly demonstrates in the following way. When by the action of the chloroform the pressure has gone down nearly to zero, and there is no pulsation visible, compression of the thoracic aorta between the crura of the diaphragm, or the mere compression of the abdomen, restores to the pulse its strength and frequency, and causes the pressure in the manometer to rise to a considerable

height, very often to 100 or 120 millimetres. This fact proves that the heart, notwithstanding its apparent paralysis, is still able to maintain the almost normal pressure of the blood, and to contract with more strength than before when the pressure is acting upon its walls and opposing itself to their contraction. The apparent paralysis must depend on this cause; the vaso-motor nerves are paralyzed, inasmuch as all the vessels of the body are dilated; their increased capacity retains the blood, now no longer returned to the heart, which becomes bloodless in a secondary manner. Compression of the abdomen, or ligatures to the upper and lower extremities, produces a compensation for the increased capacity of the bloodvessels, and in this way the circulation becomes more normal, while before it had suffered, not through paralysis of the heart, but from paralytic dilatation of the peripheral vessels."

As regards the comparative value of ether and chloroform, Professor Schiff continues: "Our own experiments bearing on this argument enable us to say that in more than three thousand cases we have adopted etherization with a view to preserve the life of animals, and that with the few exceptions indicated elsewhere (Memoir on the Laryngeal Nerve), not a single case of death occurred. On the other hand, chloroform has cost us a considerable number of animals when I have wished to push anæsthesia to its ultimate stage.

"Our experiments confirm more and more that in etherization the pressure of the vessels maintains itself to a height almost normal and always compatible with the continuance of life even after the cessation of automatic and the substitution of artificial respiration, so that the mere continuance of breathing gives us a safe warranty of the vitality of the individual. Often in experiments made with this view, we have seen that at the moment of the cessation of automatic breathing the circulation was still in so normal a state that the commencement of asphyxia indicated still the *asphyxic height* of vascular pressure as measured by the manometer; that is, instead of falling before death, the pressure rose through the accumulation of carbonic acid, which, as is known, is an irritant of the vascular system and of its nerves.

"When, after the cessation of breathing, one at once applies artificial respiration with air that is passed over a stratum of ether, so that etherization is still kept up, one is able, by regulating the quantity of ether that is mixed with the air, to continue for hours the etherization of the animal, which no longer breathes spontaneously, without the pressure of the blood being notably diminished, and without danger to the life of the animal, which one can always resuscitate by introducing pure air into the lungs.

"It is true, however, that the pressure of the blood always diminishes slightly, so that after two hours it may have fallen, for example, from 120 to 80 millimetres; but such a fall is not prejudicial to life. One is able in these experiments to regulate with facility the quantity of ether, commencing with a low temperature of the vessel that contains it. If one finds that the animal shows a ready tendency to recommence certain automatic respiratory movements, Wolf's bottle, which contains the ether, and is connected with the bellows and manometer by means of India-rubber tubes, is brought rather nearer to the body of the animal so as to increase the heating effect.

"It is otherwise with chloroform. In animals in which, under the influence of this agent, the pressure of the blood has been examined with the manometer, one finds that the pressure is already considerably lowered before automatic respiration has ceased; and we have frequently seen the pulse disappear almost entirely in the manometer, whilst the pressure fell to 25 or 30 millimetres, and the dog still breathed spontaneously.

"In dogs in which one employs artificial respiration from the commencement, causing the air to pass through a bottle containing chloroform, so that in entering the lungs it is but feebly loaded with this agent, we have seen the pressure, sometimes immediately, sometimes after a longer period, lower itself almost to zero, while the extremely weak pulse which the manometer recorded has also ceased soon afterwards, the respiration being continued as at the beginning of the experiment. It is therefore certain that in these cases it was not the cessation of the respiration, nor its weakening, that killed the animal. This becomes yet more evident through the experiments in which, after the cessation

of vascular pressure, when the pressure was that of blood almost at rest, one suddenly replaced the respiration of chloroformized air by normal air without being able to save the animal.

"After a few forced inspirations one sometimes sees the automatic breathing of the animal recommence. This may be up to two, four, and, as in one case, ten automatic inspirations; but the pressure of the blood does not rise, and the dog dies through cessation of circulation.

"Fortunately things do not always go thus. It is possible to find that a very limited quantity of chloroform mixed with the air may maintain a state of apparent death without any automatic respiration, and with an extreme fall of arterial pressure that yet admits, after half an hour's continuance of chloroformization, of the re-establishment of life on pure air being introduced. But the keeping the animal alive in such an experiment is always uncertain: we cannot make sure, as with ether, that the animal will be revived. We are never able to say, and this is a great point, what the limit of chloroform is in the inspired air, which affords us a certainty of the animal being restored."

Prof. Schiff considers that chloroform should be banished from practice as an anæsthetic agent, except in cases in which extraordinary resistance to the effect of ether shows itself, in which instances it might be allowed to mix a little chloroform with it in order to produce the commencement of anæsthesia, which should afterwards be continued with pure ether.

Prof. S. warns surgeons not to continue on operation immediately on a patient's recovery from the excessive action of anæsthetics, but to wait until respiration has been energetically restored, otherwise a new and generally fatal asphyxia may be produced.

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14. *Physiological Action of Coca.*—Dr. Alex. Bennett states (*Brit. Med. Journ.*, April 18, 1874) that with the aid of Messrs. Macfarlane & Co., chemists, he succeeded in obtaining a small quantity of the crystalline substance cocaine ($C_{16}H_{19}NO_4$). With this he conducted a series of experiments and observations on the lower animals, from which he ascertained that cocaine is a powerful poison with special action on the nervous system. He has also experimented with theine, caffeine, guaranine, and theobromine, with a view of determining the actions of each.

The following are his conclusions:—

1. The physiological actions of coca, tea, coffee, guarana, and cocoa, are mainly, if not entirely, due to their neutral principles.

2. Cocaine, theine, caffeine, guaranine, and theobromine are powerful poisons, inducing a series of symptoms affecting the nervous, respiratory, circulatory, vaso-motor, and glandular systems, which terminate, if the dose be large enough, in death.

3. These five principles are, to all appearances, identical in physiological action.

4. In small doses not ending fatally, these five substances produce—*a*. Cerebral excitement not succeeded by coma, and *b*. Partial loss of sensibility.

5. In large doses they produce—*a*. Cerebral excitement, *b*. Complete paralysis of sensibility, *c*. Tetanic spasms and convulsions, and *d*. Death.

6. They paralyze the entire posterior column of the spinal cord, also the entire system of peripheral sensory nerves; but the anterior columns of the cord and the peripheral motor nerves are not paralyzed.

7. They frequently produce convulsions of a clonic character, but occasionally they cause tetanic spasms, which latter are sometimes so severe as to induce opisthotonos.

8. They do not produce muscular paralysis.

9. They at first increase, then impede, and lastly stop, the respirations.

10. They at first increase, and finally diminish, both the force and frequency of the heart's contractions.

11. They produce at first contraction, and afterwards dilatation, of the capillaries and small bloodvessels, with stasis of the blood, indicating first irritation, and subsequent paralysis, of the vaso-motor nerves.

12. They affect the temperature by first slightly lowering, and secondly increasing it.

13. They usually produce contraction of the pupil.

14. They produce an increase of the salivary secretion.

15. They induce a peculiar form of tenesmus, accompanied by a copious discharge of clear mucus from the bowels.

These conclusions have been arrived at after a careful series of experiments conducted on more than one hundred animals of different kinds; and it is extremely interesting to learn that those agents, which the different nations of the world have found by experience to produce refreshing and stimulating beverages, although unlike one another and procured from totally different sources, possess in common proximate principles, which not only are almost identical in chemical composition, but also appear similar in physiological action.

According to the above observations, cocaine has the same action as theine, etc.; so, for clinical purposes, the latter is at present preferable on account of the enormous expense of the former. That the effects of the beverages themselves are mainly, if not entirely, due to the neutral principles they contain, is highly probable; but of their beneficial action in medical practice I am not yet in a position to give an opinion. However, from their stimulant action and effect on the nervous system generally, there is every reason to hope that the concentrated forms of these drugs, or the neutral principles themselves, will prove powerful and useful agents in the hands of the physician for the treatment of disease.

Before the medical man can practise his profession scientifically, he should be acquainted, not only with the natural course of the malady he proposes to alleviate, but also with the physiological effects of the drug by which he hopes to reach this end. By observations upon the lower animals, he may also obtain suggestions and information which will materially assist him in relieving and benefiting the human being.

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15. *Importance of the Purity of Chloral Hydrate.*—Dr. OSCAR LIEBREICH has recently published a paper in the *Berliner Klinische Wochenschrift*, in which he calls attention to the important subject of the purity of chloral hydrate, and the effect which its deterioration may produce on the patients to whom it is administered, and on its reputation as a remedy. The case, he says, is different from that of such a substance as quinia, the adulteration of which will only reduce, but will not pervert, the proper action of the drug. With chloral and other substances prepared by analogous chemical processes, the result of the manufacture may be the formation of compounds which, if administered, produce an altogether different result from that intended. The process of manufacture is one which requires great care; and it seems that it is at least difficult to insure the purity of chloral, if made in large quantities. Liebig himself, who discovered it, never attempted to make more than a few grammes at once; and Dr. Liebreich was so convinced, when he brought it into notice as a medicinal agent, that purity was necessary for success, that the first supplies were made under his immediate superintendence. At present, it is manufactured in various places; and the result is that, in some parts of the continent, notably in Saxony and Switzerland, it has fallen into disrepute. Dr. Liebreich has made a collection of specimens of the drug used in cases where it has failed to produce its proper action, and possesses, he says, some horrible chemical compounds which he would not venture to give to a human being. He prefers the crystallized form of chloral hydrate as the most stable. It may contain hydrochloric acid; this is no disadvantage if the proportion remain the same; but, if it increase, it indicates that the formation of dangerous compounds may be going on. Sometimes the hypnotic action is increased; this he attributes to the production of chlorine compounds, which are more readily changed into chloroform than chloral itself is. An acid reaction, arising from the formation of trichloracetic acid, does not show that the chloral is unfit for use, though it weakens its action. In pure chloral, this action is limited; while impure chloral is liable to the constantly increasing production of acid compounds—not trichloracetic acid—of a deleterious nature. Dr. Liebreich remarks that

the German *Pharmacopœia* is in error in fixing the boiling point of chloral hydrate at 95° Cent. (203° Fahr.). This, he says, is correct for anhydrous chloral; but the boiling point of chloral hydrate is not constant.—*Brit. Med. Journ.*, March 21, 1875.

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16. *Ergotin as a Means of Arresting Hemorrhage.*—The following results obtained from some accurately recorded experiments on this drug made by Dr. Drasche, Chief Physician to the Rudolph Hospital, are communicated by Dr. C. Schwaighofer to the *Irish Hospital Gazette*, May 1.

It was first determined by experiment on animals, that a strong solution of ergotin when brought into contact with an artery, even when the artery was wounded, had the effect of lessening its calibre and so checking hemorrhage. This at once led to the conjecture, that if the drug were introduced directly into the circulation, and thus brought into actual contact with the walls of the vessels, its action would be more rapid and effectual than if it entered the system through the stomach. It hence follows that the subcutaneous injection is the most effectual way of administering this remedy. As there is no preparation of ergotin in the Austrian Pharmacopœia, only an alcoholic extract of the secale cornutum, very similar, however, to the ergotin of Bonjean, the extract was the preparation used in these experiments. Glycerine proved to be the best solvent. Water was found to be not nearly so appropriate, as well from its inferior power as a solvent as because a sediment soon formed in the solution, and the undissolved resinous particles were liable to stop the needle of the injection-syringe and thus greatly increase the mechanical difficulties. Another objection to the watery solution is, that fungus soon forms in it, which at once renders it useless. A solution of 5 grains of ergotin in a drachm of glycerine proved to be the one most suitable for general use. This solution is of a dark brown colour, somewhat translucent, and even after it has stood a considerable time, the amount of sediment deposited is very small. It has another great advantage, viz., that it remains for a long time absolutely free from any fungous growth. A Pravaz's injection syringe, when filled with this solution, contains just a grain of ergotin. The effect of injecting this solution was first tried on several perfectly strong and healthy persons, with the following results: After each injection the number of heart-beats in a minute was lessened by from four to six; a diminution in the size of the arteries was demonstrated by the sphygmograph; the temperature was very slightly elevated, while the respiration remained perfectly undisturbed. The proportion between the amount of fluid imbibed within twenty-four hours and the quantity of urine passed was not affected; the appetite, digestion, and sleep also remained undisturbed. The local effects of the injection deserve notice. Generally, very soon after the injection the skin became reddened; this redness was usually circumscribed, but was sometimes diffused. The time it lasted was variable; in some cases but a very short time, in others for several days, sometimes disappearing for a short time only to return again better marked than ever. In some cases when the redness had disappeared there was left a greenish-yellow discolouration, showing the metamorphosis of the colouring matter of the blood. The redness, if very well marked, was often accompanied by increase of temperature, and pain and tenderness at the point of injection. There was, in some cases, swelling followed by induration, which lasted a considerable time; this happened more especially when the watery solution was used; indeed it was never seen to occur after glycerine. The experiments as to its hæmostatic powers were mostly made on phthisical subjects who had hæmoptysis, either after the usual means, such as ferri sesquichlor., alum, digitalis, plumb. acet., etc., had been tried in vain, or especially in cases where the hæmoptysis began as an actual hemorrhage. However, the ergotin was also tried in cases of epistaxis, hæmatemesis, hemorrhage from the bowels in enteric fever, and especially in scorbutic hemorrhages, and generally with success, even though the improvement was sometimes only transient. In cases of hæmoptysis the quantity of ergotin that was injected was from 1 to 1½ grains; in exceptional cases this was increased to 7 grains (spread over several days) which was the maximum dose. The local inflammation was always propor-

tional to the strength of solution. The injections were always made in the neighbourhood of the greater pectoral muscle. Usually, shortly after the injection, the skin around the puncture became red and tender, with a sensation of burning and often of pain; sometimes there was swelling and persistent induration with greenish-yellow discolouration of the skin. In four very obstinate cases of hemorrhage in advanced phthisis, where cavities had already formed, the hemorhage was checked after from one to three injections; indeed in one case a single injection proved sufficient. Even in those cases where the hemorrhage was not at once checked it at all events became much less copious, and frequently only remained as a painful expectoration of coagula, which ceased after a few more injections. The rapid effects produced by the subcutaneous injection of the ergotin were all the more striking, as, shortly before, much larger doses of this drug had proved inert when administered by the mouth. In some cases where a copious hemorrhage had its origin in a large cavity, of course we could not expect ergotin to work miracles, and still only in a single such case was its use absolutely without effect. One phthisical young man, who had been attacked every morning for a week with violent epistaxis which had been treated unsuccessfully for four days with ice and perchloride of iron, was completely cured after two one-grain injections of ergotin. In scorbutus, where the cause of the hemorrhage is want of tone and a liability to rupture in the walls of the vessels, ergotin is particularly useful, especially when other remedies have been tried and have failed. These results show that this remedy is in general practical and effective. To the practitioner it cannot but be most comforting in dangerous cases to have at hand a remedy at once so certain and so easily applied, especially where sudden and profuse hemorrhage calls for immediate action, and where, as too often happens, great difficulty is met with in administering internal remedies.

17. *Active Agent of Ergot.*—Dr. A. WERNICH has recently made some investigations in regard to the active principle of ergot in the Berlin Institute. He finds that the watery extract is far more powerful than either the alcoholic or the ethereal extract. The watery extract, when purified by alcohol and ether, forms a mucous or slimy mass which cannot be dried. The active agent appears to be of the nature of an acid soluble in alcohol when pure, but insoluble when in combination with bases.—*Lancet*, April 4, 1874.

18. *Importance of Salts in Food.*—FOSTER (*Zeitschrift für Biologie*, vol. ix. p. 297) has made some interesting experiments on dogs and pigeons, which show that animals die when inorganic salts are altogether absent from their food, although the other nutritive constituents may be abundant. In all animals, a condition of muscular weakness and tremor occurred, which is best designated by the term general exhaustion. The weakness of individual groups of muscles in the dog, and especially those of the posterior extremities, from the second week of the experiment onwards, gradually assumed a paralytic character, such as is observed when the function of the spinal cord is weakened. The activity of the cerebrum was also impaired, as was evident from the increasing bluntness of the senses and the apathy of the animal. Later on, symptoms of increased excitability often appeared. Thus, when the author quickly entered the room where one of the pigeons had ventured upon the cross bar of the cage, it fell suddenly upon the floor of the cage, and there remained crouched in the ordinary stupid position with its eyes closed and its head drawn in. Dogs always cowered at once, as if terrified, whenever any quick motion was made towards them even from a distance. On one occasion, one of them had an attack of madness, springing at the keeper and barking, but crouching down, trembling and growling, when it heard his voice. On being taken out it ran straight forward, and knocked its head violently against a wall in its way. There was tonic contraction of the muscles of the jaw and neck. After the animal has been deprived of salts for some time, the juices of the intestinal canal either lose their digestive power or are not secreted in proper quantity, and nutrition is thus interfered with. Death takes place, however, from the alterations in the nervous system, before there has been time

for it to occur from inanition. The quantity of salts necessary to life is smaller than is generally supposed, but the exact amount required is still to be determined.—*London Med. Record*, May 13, 1874.

MEDICAL PATHOLOGY AND THERAPEUTICS, AND PRACTICAL MEDICINE.

19. *General Angioleucitis of the Lungs.*—Dr. Reynaud, Physician to Lariboisière Hospital, describes (*L'Union Médicale*, Nos. 35 and 36, March, 1874) two cases of an affection to which he gives the above name, one observed by himself in his own wards, and the other by his colleague, Dr. Féréol, in his wards.

The study of these two cases leads Dr. R. to the following conclusions:—

1. There exists a lesion of the lungs not hitherto described in our classical treatises, and characterized by a vascular turgescence of all the lymphatic vessels, both superficial and deep-seated.

2. This lesion deserves the name of angioleucitis. Although it has some relation to cancer, particularly to cancer of the stomach, we are not justified in denying that general angioleucitis of the lungs may be developed independently of the existence of any cancerous affection. Probably angioleucitis of the lungs may be simple or specific, at the same time presenting great similarity in an anatomico-pathological point of view.

3. This angioleucitis constitutes a grave complication, and may cause death by the lungs in patients affected with primary lesions of other organs.

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20. *Dizziness and its connection with Migraine.*—Dr. T. Clifford Allbutt states (*Brit. and For. Med.-Chir. Rev.*, April, 1874), "It is most important to be able to assure sufferers from this alarming malady that it is one which is fraught with no more danger to life than a sick headache, for dizziness often comes on in the later life of those who had migraine when younger, comes on, that is, at a time when cerebral symptoms are viewed with growing uneasiness. . . . . A distinguished churchman lately complained to me of such a transient vertigo, which would seize him from time to time, not respecting him even when in the pulpit: for a moment he is confused, he makes a strong effort, the giddiness diminishes, and he is safe. Up to middle life he suffered from migraine in the usual form; now he never has it. Compare this with the state of a clergyman whom I once saw, who comes of a highly nervous stock, who had migraine intensely up to middle life and in whom the migraine then gave way to vertigo. He would be seized with irresistible dizziness, which would hurl him off his feet on to the floor, where he would lie for an hour or two dreading removal. The least attempt to raise his head would always bring on an increase of this distressing symptom and a sense of nausea. After a while he would vomit, and all would come right. This case came under my notice about ten years ago, and I understand that the attacks still recur, but in a much less degree. His health is otherwise good.

"I have another patient to whose case the same description would apply. He has been under my occasional care for some years for this kind of vertigo, ending, when severe, in vomiting. Not many weeks ago he was found in the street clinging to a railing, and was brought to my house. There he remained incapable of raising his head until free vomiting occurred, when he obtained his release. This gentleman had suffered greatly from migraine, as a young man, and nearly all his children have been under my care for nervous affections. Now is there any organic connection between the last and the earlier states of another and similar case which I have now under observation. Mr. X— is a nervous man, and for many years had migraine. Then, as he lost the migraine in middle life, he became subject to the vertigo, and had it in a distressing though not in an extreme form. It rarely went on to vomiting, though he was often

obliged to cling to railings and other supports lest he should fall. Some months ago he had this vertigo—for it seemed in all respects the same—in a terribly aggravated form. He remained so confused that for several days he could not raise his head from his pillow, and he vomited repeatedly but without much relief. Consciousness was never affected. As he became more able to move about, he found that the right hand was ataxic, and his articulation was also struck with ataxy. His right hand, though not weakened, was incapable of precise function; and although he never used wrong words his utterance was clipped and unrythmical. Four or five months have elapsed since his seizure, and he has slowly improved; yet the defects are far from being obliterated, and I fear he is a stricken man. If this seizure was hemorrhagic it was strangely like his preceding attacks, which were undoubtedly migrainous."

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21. *Albuminuria in Cases of Vascular Bronchocele and Exophthalmos.*—Dr. J. WARBURTON BEGBIE, in an interesting article in the *Edinburgh Med. Journal* for April last, points out the occurrence of albuminuria during and after digestion in cases of vascular bronchocele and exophthalmos. This albuminuria he says is evidently temporary and unconnected with any form of renal degeneration. He has never seen so large an amount of albumen in the urine in any other disease when the case of the albuminuria was not inflammatory or organic. In some cases it was an evanescent symptom lasting only for a short time, and when so, only present in limited degree. In others, the albuminuria has been very considerable—it has even been excessive, and it has lasted for weeks, indeed for months—while the other notable symptoms of the complex malady continued, and only disappeared as the latter became relieved or removed. Œdema of the lower limbs, although in the first instance calling attention to the condition of the urine, has not been observed to bear any constant relation to the albuminuria; on the contrary, œdema, and sometimes considerable anasarca of the legs, have been present without any appearance of albumen in the urine; and albumen, when present, has generally existed without any form of dropsical swelling. In the most notable cases of albuminuria in connection with vascular bronchocele and exophthalmos, dropsy has not been present.

In prosecuting my inquiry on this subject, a very interesting circumstance became manifest, namely, that the albuminuria was in certain cases limited to the period of digestion—present immediately after a meal, and absent when the person fasted. I had in one case been not a little puzzled by noticing the strange variety presented by the urine within very short periods—the albumen present in considerable quantity one day, and absent the next—present in the urine of the forenoon, and not to be detected in that passed before dinner. By obtaining repeatedly specimens of the urine in this case, and in one or two others, I was able to satisfy myself that in this disease the albuminuria is apt to possess the remarkable character of only occurring during or immediately after the digestion of the food.

In addition to the intermittent character of the coagulability, in the cases seen by Dr. B., the quantity and density of colour of the urine did not deviate from the healthy standard, and still further diligent and repeated examination by the microscope failed to detect the vestige of a cast of any kind—these are to be regarded as proofs of the renal disease being functional and not organic.

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22. *Œsophagismus or Spasmodic Closure of the Œsophagus.*—Dr. A. W. FOOT read before the Medical Society of the College of Physicians, Ireland, a description of four cases of this peculiar and not very common affection, which had been under his care in the Meath Hospital. Three of the cases occurred in man, and one in a female. In none was there any evidence of organic disease or of hysteria; and none of them were cases of what Sir Henry Marsh had termed the regurgitating disease. Dr. Foot described, *seriatim*, the symptoms in each case, which so far resembled one another in character: (1) In suddenness of occurrence; (2) In there being a more or less intermitting dysphagia, which was greater with solids than with fluids, and more likely to be excited

by cold fluids than by hot, as also by anything sour; (3) In the occurrence of œsophageal vomiting; and (4) in the co-existence of hiccough as a symptom. In two of the cases there was no cause assigned for the occurrence of the complaint, in the third it was attributed to a squeeze of the throat, in the fourth to intense grief. The whole four occurred in persons of the disposition called "nervous;" but there was no reason to believe that their symptoms were either feigned or exaggerated, or in any way under their control. The dysphagia was certainly œsophageal, not pharyngeal, and therefore beyond the influence of the will. The diagnosis of œsophagismus was, Dr. Foot observed, based upon the suddenness of its occurrence, the variability of its intensity with various kinds of food, its intermittence, the co-existence of other symptoms, especially hiccough, and the absence of other causes of dysphagia—mechanical, inflammatory, or paralytic. The œsophageal vomiting in these cases is manifestly different from gastric vomiting, in the absence of nausea and of contraction of the muscles of the stomach or abdomen, nor has the returned food any sour or acid taste. In conclusion, Dr. Foot referred to Dr. Graves' remarks on a "curious affection of the organs of deglutition,"[1] and to Sir H. Marsh's papers on "a peculiar morbid affection of the stomach, characterized by regurgitation of its contents without nausea,"[2] and remarked that cases of regurgitation appear to be more common in young females, and œsophagismus in young males.

The Chairman said that his father had had an attack of spasm of œsophagus: and that for an entire week he was unable to swallow either fluids or solids. There was no fever. The idea of death from starvation in the midst of plenty was before him, when suddenly, without any special treatment that he (the Chairman) could remember, the power of deglutition returned.

Dr. Atthill said that these cases do not prove fatal; and as showing the difficulty of deglutition that is caused by some kinds of foods more than by others, related the case of a boy, aged 12, who was under his observation, and who was unable to swallow meat, or food which required mastication.

Dr. MacSwiney could recall three cases which corresponded with the description Dr. Foot had given of the affection. They were all in men between the ages of 18 and 30, and all recovered. In one of these cases there was an enormous secrection of mucus; and frequently a morsel of food which had been swallowed one day, would be ejected unaltered, and recognized twenty-four or thirty hours subsequently. In this case there was also an enormous dilatation of the œsophagus above the seat of spasm; warm liquids alone could be swallowed. Passing a probang gave great relief. Dr. MacSwiney was led to believe that there was sanguineous congestion of the œsophageal mucous membrane, from the fact that in one of his cases blood was brought up at intervals in small quantities. Antispasmodics alone seemed to give relief in these cases, and hydrocyanic acid, especially, was *the* remedy.

Dr. H. Kennedy has seen five or six cases of this kind: all recovered. Sometimes there was a total stoppage, and other cases seemed to be able to get down a little. One of his cases had been attended with much pain. The administration of nitrate of silver in quarter-grain doses, in solution, had been particularly useful in one case. Dr. Kennedy, if he had another case, would recommend warm baths, and nitrate of silver, internally, combined with opium. He thought the disease was something of a similar kind to that affecting other parts of the body, *e. g.*, the urethra, bowels, etc. Dr. Kennedy also referred to the case of a medical man who could not swallow when in company.

Dr. W. G. Smith related the history of a case that has been under his observation for seven years. The patient had cholera in 1866. During convalescence from it he had, for the first time, an attack of spasm of the œsophagus, and could get no fluid or solid into the stomach. The food regurgitated from the œsophagus in a few moments. He had pain under left scapula, hiccough, and a copious secretion of saliva—amounting on some occasions to four cupsful

[1] Dub. Med. Journal, iii., 167.

[2] Dub. Med. Journal, xxiii., 437: and Dub. Quart. Journal Medical Science, xvi., 681.

a day—took place. The spasms occur intermittingly. On one occasion an attack lasted 100 hours. Dr. Smith had twice observed that after attempting to swallow milk during a spasm, a conical cast of curd, the diameter of the œsophagus, was thrown up. There was no evidence of hysteria or of organic disease. The effect of treatment was most capricious. On one occasion, during a spasm, Dr. Smith injected gr. $\frac{1}{30}$ of apomorphia. In five minutes afterwards the patient was nauseated, and vomiting and purging followed, but the spasm subsequently returned. Bearing out the remarks of Dr. Atthill, this patient was peculiarly liable to a spasm when he swallowed meat. He was not so subject to the attacks now as he has been.—*Irish Hospital Gazette*, April 1, 1874.

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23. *Extension of Melano-sarcoma by Embolism.*—Prof. EBORTH, of Zurich, records an interesting case showing how the extension of tumours to distant parts may occur. The eyeball was extirpated for melano-sarcoma originating apparently in the choroid. After 19 months, signs of tumour in the liver appeared, followed by rapid emaciation and death in other two months. There was found after death extensive melanoid sarcoma of the liver, and in addition melanoid and other cells were observed in the bloodvessels of the kidney and spleen. There was evidently here a passage of the solid elements of the tumour into the blood, and a direct infection of distant parts by these elements. This observation may be important as indicating how tumours may spread. In this case the cells were pigmented so that they could be readily recognized, and we must suppose that in other cases where their recognition is not so easy, a similar transportation and spread of the tumour by embolism takes place.—*Glasgow Med. Journ.*, Jan. 1874, from *Virchow's Archiv* for July, 1873.

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24. *Paralysis of the Radial Nerve caused by an unusual mode of Lead-Poisoning.*—Dr. ALTHAUS read before the Clinical Society of London (April 25th, 1874), notes of the case of a chemist who was laid up for four months with erysipelas. Some time after, he lost the use of the muscles supplied by the radial nerve, so that he was unable to use his hand and fingers. The author found, by using electrical tests, that the paralysis must be owing to the influence of lead. There are three different forms of paralysis of the radial nerve—viz., one caused by injury, a second by the influence of wet and cold, and a third by saturnine poisoning; and these may be distinguished from each other by the following signs. In *rheumatic paralysis*, the farado-muscular excitability is generally normal; there is no, or only a slight degree of, anæsthesia of the skin; and the supinator muscles suffer just as much as the extensors. In *traumatic paralysis*, the farado-muscular excitability is lost; there is anæsthesia of the skin; and the supinators suffer equally with the extensors. Finally, in *saturnine paralysis*, farado-muscular excitability is lost; there is no anæsthesia of the skin; and the supinators are perfectly healthy. This last group of symptoms being present, search was made for a source of lead poisoning; and it was at last found out that the patient had used an ounce of the unguentum plumbi subacetatis compositum as a dressing for the sore on his thigh three times daily for a month. Lead is absorbed even by a surface not denuded of its cuticle; but its absorption was in this case considerably facilitated by the highly vascular condition of the sore, and the length of time during which the lead ointment, which was spread on lint, remained on the surface of the wound. Iodide of potassium was given for three weeks without relief, but three applications of the continuous current completely restored the use of the limb. Dr. Althaus concluded his paper with some remarks on absorption of lead in general, and on the seat of the paralyzing lesion in cases of lead-palsy, showing that the loss of power is not owing to an affection of the nervous centres or the muscles, but of the peripheral nerve-trunks. He recommended to resort early to treatment by the continuous current in these cases; as, in the latter stages of the complaint, when muscular atrophy and contraction of the antagonists has set in, the effect of the same treatment is much more slow, and not nearly as complete, as in the earlier stages of the affection.—Mr. LEE

related the case of a young woman, who gradually declined in health, had loss of tone, etc., and whose ailment was traced to her occupation of shaking out cloths in a room full of dust, lead being found in the dust.—*Brit. Med. Journ.*, May 16, 1874.

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25. *The Local Treatment of Lung Cavities.*—Prof. W. Mosler, of Griefswald (*Berlin Klin. Wochenschrift*, October 27, 1873, translated in *The Clinic*, December 13, 1873), made the attempt last year to introduce remedies into the lung cavities from the outside, through the walls of the thorax, and gives the following account of his experience:—

My first attempt was in a case of phthisis in the last stage of the disease. I did not expect either cure or improvement. I only wished to demonstrate the possibility of the method. It was the case of a labourer, æt. 51, affected with right-sided pneumonia since 1869. He had had several attacks of hæmoptysis, and had become emaciated in extreme degree. In the right apex and in front was a superficial cavity reaching down to the fourth rib and of easy demonstration.

On November 1, 1872, I pushed through the thorax wall, second intercostal space, 6 ctm. from the right border of the sternum, a tolerably large canula of the well-known aspiration syringe of Thiersh. I then injected through this canula 20 ccm. of a dilute solution of the permanganate of potash. The syringe was then unscrewed from the canula, which was permitted to remain, and on three following days the injection of the same quantity was repeated. On the fourth day the canula became occluded and was removed. *The patient suffered, meanwhile, not the least inconvenience.* I was encouraged, thus, to further experiments.

In February, 1873, I repeated this experiment in a case of left-sided bronchiectatic cavity whose secretion had assumed a fetid, putrid character. After five injections, which were borne without difficulty, the secretion had changed for the better and the general condition had materially improved. I considered myself justified, then, in repeating this experiment in another way, *in order to give the secretion free exit and escape.*

In the case of a painter, æt. 49, who had been treated in my clinic for five years for a bronchiectatic cavity of the right upper lobe, who had had several attacks of hæmoptysis, suffered often with fever, had become extremely emaciated, and, besides all this, had amyloid degeneration of the kidney, as shown by an abundant deposit of albumen in his urine, I made an opening, July 2, 1873, assisted by my colleague Prof. Hüter, into the very superficial cavity, in the following way:—

A long incision (3 ctm.) dividing the skin and superficial intercostal muscles, commencing about 5½ ctm. from the right border of the sternum, was made along the upper border of the third rib. The long duration of the affection pre-implied a firm adhesion between the two layers of the pleura, so after dilatation of the incision through the muscle, the wall of the cavity was gradually opened with a suitable pair of forceps, penetrating more and more deeply into the bottom of the wound. A whistling sound in inspiration and the escape of a purulent secretion mingled with air bubbles furnished the certain proof that the cavity had been opened. No hemorrhage occurred. After the opening into the cavity had been somewhat dilated, a pretty large silver drainage tube was introduced into the cavity and fastened with plaster to the wall of the chest. Pledgets of carbolized lint and an ice bladder were then applied. The patient endured the operation very well.

On the evening of the same day the temperature was 37.8° C. the pulse 84, respirations 36. General condition good. *Pus flowed through the canula abundantly, particularly in coughing.* The bandage had to be renewed several times during the day. *Cough and secretion were both less.*

On July 12, a hæmoptysis occurred, perhaps as the result of granulation formation in the cavity. A dilute solution of liquor ferri sesquichlorati was blown through the canula, whereupon the hemorrhage soon ceased.

Subsequently, a dilute solution of carbolic acid and tincture of iodine was

brought into the cavity, twice daily, by the same *pulverisateur*. He declared that he felt it enter the cavity.

Injections of larger quantities of a solution of permanganate of potash by means of Esmarch's irrigator were not borne so well. A sense of tightness followed and febrile excitation. I desisted from their use thereupon and continued the use of the atomized fluid, satisfied that a sufficient quantity entered the cavity through the canula on deep ins- and expiration.

The pus had now assumed a laudable character and was less profuse. There could be no doubt that this disinfection had a better result than the inhalation of carbolic acid by the mouth.

Percussion showed a more marked cracked-pot sound than before, probably in consequence of the external opening. The rales, however, were less intense. The patient had no especial complaints to make as to any trouble in the lungs. His condition was better after than before the operation. The process in the lungs, moreover, seemed to have made no essential advance. There was, however, no improvement in the general status, as was expected there should be, at the start. The albumen in the urine increased, and the general strength reduced so that he was confined to bed.

On my return to Griefswald, Oct. 1, the condition of the patient had so far changed for the worse that he continued to lose strength in spite of nourishment and stimulation, and albumen continued to increase in the urine. Emaciation was very marked, appetite and stool normal. Fever had not persisted. The temperature had never risen above 37.6° C., morning or evening. There was but very little cough and expectoration. Pus continued to flow freely through the canula, however, on which account I continued the insufflation through the canula of dilute carbolic acid twice daily. Physical examination revealed no essential change. The process in the lungs had not advanced. Respiratory difficulties had been hitherto but little marked, occasionally there was a distressing fulness and sense of pressure in the epigastrium.

On Oct. 3, his condition became markedly worse. The heart's action was much reduced, indications of collapse set in. The temperature fell to 36.6° C., the pulse was barely perceptible, and there was complaint of dyspnœa. Stimulants effected no improvement. On the next day over the whole left lung there could be heard fine rales which increased in intensity. He died with manifestations of cardiac paralysis, on Oct. 5, at 7½ P. M.

The *post-mortem* revealed an extremely emaciated body, subcutaneous and muscular tissues markedly atrophic. After opening the thorax, the left lung retracted well; *the layers of the right pleuræ were perfectly adherent.* The left lung firmly adhered at the apex, less in the region of the posterior section of the lower lobes. On section, the upper as well as the lower lobes seemed vascular, their substance containing in small numbers, partly in discreet form, partly in small circular groups, grayish-white nodules. The mucous membrane of the bronchi was slightly injected, else normal. *The right lung in its whole extent, most markedly from the third rib upwards, was solidly adherent to the pleura costalis.* After removal it showed from its apex to the border of the lower lobe, a whitish pseudo-membrane of several lines thickness and of almost cartilaginous consistence. *At the lower lobe is a canal running obliquely from before and below, backwards and upwards, with smooth walls, and of the diameter of the canula above described. This canal leads to a cavity which takes up the greatest part of the upper lobe.* The cavity is filled with yellowish purulent fluid. The inner wall of the cavity is marked by projecting prominences differing in their reddish colour from other parts of the wall of the cavity, which have a grayish-black colour and smooth surface. The prominences show distinctly in places *a feebly granulated surface.* A watery reddish tinged fluid exudes on pressure from the cut surface of the lower lobe. Here, too, are to be seen in very small numbers discreet or grouped grayish nodules, of the size of a barleycorn.

I believe I am justified in one statement as a certain conclusion from these experiments, viz., *that the local treatment of lung cavities can be effected.*

As is well known, such a proposition was made by Barry in 1726, and renewed

later by Masse, v. Herff, Hooken[1] without, however, any practical results. Numerous objections were urged, in regard to the difficulty of diagnosis and successful accomplishment of the operation. The great advances of modern medicine and surgery, in great measure, remove these fears.

As to the final conclusion concerning the value of this operation, opinions will differ. Probably the conclusion will be the establishment of different indications. The cases communicated show that the operation has value as a symptomatic method of treatment. The condition of the last patient was better after than before the opening. The cough was less distressing after means of escape was offered to the pus. And in consequence of the disinfection of the cavities, the *fever was less.*

There can be no doubt that my experiments have proven one fact, viz., that the *lung is more tolerant of external manipulation, that these external attacks are less dangerous and more easily executed than has been heretofore believed.*

Dr. Wm. Pepper, unaware of these observations, treated (*Philadelphia Medical Times*, March 14, 1874) three cases, in February, 1874, by injections through the chest-wall, and remarks that it is probable that this mode of treatment will find one of its most successful fields of application in chronic non-tuberculous cavities in the lungs, in cases where the remaining lung-tissue has not become the seat of secondary tuberculous formations. It is of course uncertain how much curative action we may be able to exert in such cases by any local application made through a canula. In the only case I have reported where the treatment has been continued long enough to produce any decided action, it is unquestionable that a certain degree of positive improvement has occurred both in general symptoms and local signs. And I am encouraged to hope that, with further experience, definite modes of treatment may be formulated which will prove of material benefit in this hopeless class of cases.

Further, I cannot see why, if it be not injurious to pass a delicate needle through the infiltrated wall of a cavity, we may not introduce it into the centre of superficial circumscribed indurations or caseous infiltrations of the lung-tissue, and make such injections as may tend to induce absorption or reparative action. Finally, it appears to me that we have in this mode of making local applications to the lung-tissue, a valuable means of treating some cases of severe hæmoptysis, especially when the hemorrhage proceeds from a well-defined seat of disease.

In regard to the mode of making the puncture, I have hitherto employed the finest (No. 1) of the needles accompanying Dieulafoy's aspirator, and have used it with the "previous vacuum" attached. For the first exploratory diagnostic puncture it is probably desirable to employ an aspirator, as it would also be if it were desired to empty such cavities before injecting them. But for the continuance of the treatment it will perhaps be quite as well to use a capillary canula, with trocar which can be withdrawn, so that a syringe can be fitted to the canula and the injection made. I have employed local anæsthesia by freezing, and have directed the patients to take a full breath and to hold it before the puncture was made.

The only fluid which I have as yet injected has been dilute Lugol's solution (℥iv to f℥j), of which from four to ten minims have been injected. The entire absence of signs of irritation makes me confident that a larger quantity could be introduced without injury. This substance appeared suitable for the cases in which I have thus far operated. It is probable that other solutions, astringent or antiseptic, may be found preferable in some cases. In cases of local consolidations, solutions of iodine might also be expected to prove most beneficial.

I design employing a dilute solution of Monsel's salt for injection in suitable cases of serious hæmoptysis.

The practical value of this mode of treating pulmonary diseases is as yet un-

[1] C. Canstatt's Specielle Pathologie und Therapie vom klinischen Standpunkte aus bearbeitet. Supplement to 1 and 2 ed., by Dr. E. H. Henoch, Erlangen, 1854. Notwithstanding numerous efforts I have not succeeded in obtaining the original papers of these authors.

certain. But it has appeared to me that, considering the almost hopeless nature of some of these lesions, the proof that a puncture may be made into the lung-tissue and remedial agents brought into direct contact with the seat of disease without any serious danger, calls for a patient trial of it.

Dr. JAMES H. HUTCHINSON (*Phil. Med. Times*, May 30, 1874) cites a number of authors to prove that the above suggestions are not novel, and believes that the operation is not one which is likely to result in good to the patient. In the first place, the presumption in regard to its usefulness is against an operation which, after having enjoyed a brief popularity during at least three or four different periods, has been so utterly forgotten that it has been as many times proposed as entirely new, and is certainly against one in which the opportunities for performing it would be so frequent as they are in this. The quotations which we have introduced above demonstrate with sufficient clearness that the lung may in many instances be laid bare and punctured without apparent injury to the patient. We are inclined to think that this is by no means uniformly the case. In one of the cases reported by Dr. Pepper a slight hemorrhage followed the introduction of the aspirator; and the same accident occurred in the operations done by Dr. Mosler and Dr. Hastings. We are, moreover, very strongly convinced of the fallacy of the argument that, because punctured wounds of the lungs in healthy individuals generally do well, their infliction upon consumptives is not likely to be followed by bad results. Niemeyer—we believe (for we quote him at second hand)—goes so far as to say that the inflammation excited by wounds of the lungs usually terminates in phthisis; but, admitting that this distinguished physician may push his conclusions as to the nature and origin of this disease to an unwarrantable length, there are certain differences in the anatomy of the lung in health and disease which ought not to be overlooked. Caseous degeneration is not the only change which is observed in phthisis. There is in addition to this, in most cases, a development of connective tissue, the effect of which will be to enlarge and keep open the wound made by the aspirator or trocar, and thus to allow the escape of the contents of the cavity into the pleural sac whenever this is not prevented by firm adhesion; and that cavities are not always protected by adhesions is shown by the occasional occurrence of pneumo-thorax from their rupture. Moreover, the opinion that injections may be of service in the treatment of phthisis rests, we think, upon a mistaken therapeutic basis. In certain conditions of the serous membranes these are unquestionably useful by exciting inflammation; but a little reflection will convince any one who has abandoned in whole or in part the theory which makes phthisis the result of tubercular deposit that this is the very last thing to be desired in this disease. The object aimed at in the management of phthisis, and especially in those local cases in which Dr. Pepper thinks the injections are most likely to be useful, is to allay inflammatory action, not to excite it. We therefore are unable to see how they can be productive of any good; on the contrary, if they light up an inflammatory process in the walls of the cavity, this will be very likely to extend to the circumjacent tissue, and thus the disease, which may have been previously held in abeyance, be roused into activity.

In conclusion, we have only to add that we never condemn a plan of treatment on purely theoretical grounds, and will gladly adopt the one under consideration if the result of further experiments shall convince us of the incorrectness of the unfavourable opinion we have formed of it. In the mean time, however, we shall remain in full accord with Dr. Hughes Bennett,[1] who thinks that the result of all operative interference in phthisis has been "what an intelligent consideration of the pathology of the disease might have anticipated—a uniform failure."

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26. *Employment of Bromide of Potassium as an Auxiliary in the Treatment of Intermittent Fevers.*—Dr. VALLIN does not question the general efficacy of quinia in the treatment of intermittent fevers, but he observes that there are some rare cases where, in spite of the judicious and prolonged use of this alka-

[1] Reynold's System of Medicine, vol. iii. p. 589.

loid, the malady continues, and in such circumstances the bromide of potassium appears to be beneficial as a subordinate agent. A case seen by Dr. Vallin in the hospital of Batna, in Algeria, first drew his attention to the subject. A patient suffering from ague had been treated in vain by the sulphate of quinia, given by the mouth, in injections, and hypodermically; notwithstanding these and other similar measures the disease returned every morning at the same time and with great and extraordinary violence. Dr. Vallin was therefore induced to ask himself whether in such a case there was not an unusual complication of disorder of the nervous system together with the ordinary paludal cachexia, and hence he thought of employing the bromide of potassium, which appears to have the power of allaying spinal irritation, and is therefore used in epileptic and other kindred affections. At the end of three days after employing the bromide the fever disappeared for the first time for three weeks and did not reappear for a week. In six other cases he employed the same remedy, with results somewhat different, but generally satisfactory. He thinks that the bromide probably acts less against the periodicity of the fever than against some concomitant disorder of the cerebro-spinal functions; that perhaps an exaggerated sensibility of the spinal cord or some nervous exhaustion may favour the return of the paroxysms; and that the bromide may in such cases, by calming the nervous excitement, assist the action of the quinia. Whatever may be the explanation, the results were satisfactory in several cases which are recorded by Dr. Vallin; four were instances where the treatment was certainly beneficial, but in two others the results were doubtful, and in three more the treatment failed altogether. In an additional case mentioned, a ward attendant, who had suffered previously from attacks of fever, and subsequently had an attack of neuralgia which resisted quinia and hypodermic injections of morphia, was relieved most materially by the use of the bromide of potassium in large doses, which not only seemed to cut short some of the paroxysms, but to render others more supportable, and to allow the renewed use of the sulphate of quinia and thus complete the cure.—*Brit. and For. Med.-Chir. Rev.*, April, 1874, from *Bull. Gén. de Thérap.*, Nov. 30, 1873.

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27. *Carbolic Acid in Intermittent Fever.*—Surgeon McNally states (*Indian Med. Gaz.*, April 1, 1874) that he made trial of carbolic acid in the treatment of uncomplicated intermittent fever during an extensive prevalence of this disease in the 3d Regiment, at Secunderabad. "These trials," he says, "prove at least that carbolic acid is much inferior to any of the other remedies employed. It is now my belief that this medicine is of *no value whatever in the treatment of intermittent fever*, and that the patients would have got well as soon with the usual aid of a purgative, rest, and a blanket. In some cases (not recorded) a few doses of quinia or of quinidia were sufficient for cure after the marked failure of carbolic acid. I am not in a position to speak positively with regard to the reputed diaphoretic action of carbolic acid, but I think it is very doubtful. Abundant diaphoresis certainly did occur in the patients who were taking it, but also occurred in the patients who were not. Irritability of stomach was a common accompaniment of the fever which prevailed in this corps during the past year; and, contrary to what might be expected, carbolic acid did not seem to alleviate it in any case. These observations are, I think, sufficient to establish that carbolic acid cannot be relied upon in the general treatment of ague, and that its value in any case is, to say the least, exceedingly problematical."

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28. *Hypodermic Injection of Carbolic Acid in Erysipelas.*—Dr. Aufrecht, of Magdeburg, having last year lost four patients of advanced age who were attacked by erysipelas of the extremities after injury, determined to try the effect of carbolic acid, and in a short paper in the *Centralblatt* for February 21, he communicates the results which he obtained in two cases. If (he observes) it be true that erysipelas in such cases as these arises from the penetration of organisms into the subcutaneous tissue, and their multiplication there, and if carbolic acid possess the power of destroying such organisms or of impeding their injurious influence, this substance should be able to prevent the

spreading of the erysipelas, and to a certain extent diminish its danger. In order to ascertain whether carbolic acid may be hypodermically employed without any ill consequence, he experimented upon himself with a 1 per cent. solution, of which he threw in six decigrammes at a time—*i. e.*, the amount contained in an ordinary Pravaz's syringe. Neither local nor general ill-effect resulted. Since then he has employed the injection in two cases—the one a woman aged fifty-six, with erysipelas of the forearm and the hand, arising from a slight abrasion; and the other a man, aged eighty-two, with erysipelas of the thigh following slight ulceration of a cicatrix. In the first case five injections were employed during three successive days, and in the second four injections within two days. The injections were thrown into the sound subcutaneous tissue just beyond the margin of the erysipelas as it advanced towards the trunk. Its progress was at once arrested in the direction where the injections were made, the injection being repeated in consequence of some insular erysipelas appearing beyond the first injection-points. More remarkable still than this limitation of the erysipelas was the decided influence of the injections in diminishing the febrile action and the frequency of the pulse, and in inducing a general improvement in the patients' condition. Convalescence was quite satisfactory in both patients.—*Med. Times and Gaz.*, March 28, 1874.

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29. *Guarana in Chronic Rheumatism.*—Mr. E. A. RAWSON states (*Irish Hosp. Gaz.*, April 15th, 1874) that when suffering severely from lumbago, and other remedies failing, he tried guarana as an experiment. He took 15 grs. in hot water, with cream and sugar, and experienced entire relief from pain for 24 hours. When the lumbago returned he took another dose with the same result. "I gradually," he says, "increased the dose to 40 grs., and took it regularly, once a day, for about a week. The lumbago disappeared. I gave up the guarana, and in a few days the pain in the back returned. A 40 gr. dose removed it, and it did not return for several days afterwards. Now, whenever it does, I have my remedy at hand. During the last month I have experimented largely with guarana on a variety of patients, rich and poor. The results vary. When the pain is acute, coming on with sharp stings, guarana acts like magic; when it is of a dull, aching character, the drug is slower in its action, and several doses must be taken before any decided benefit can be perceived.

"I have come to the following conclusion, viz., that whenever the fibrous envelopes of nerves, the aponeurotic sheath of muscles, the fasciæ or tendons are the parts affected, guarana gives, if not instantaneous, at least very immediate relief, which will last from twelve to twenty-four hours; and I confidently expect that perseverance in the use of the drug, gradually increasing the dose up to 40 grs., will entirely remove any of the above mentioned kinds of rheumatism.

"Of the good effects of guarana on nervous hemicrania there is no doubt; and I trust it will prove, in other hands, as valuable against rheumatism as it has in mine."

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30. *Gelseminum in Odontalgia and Facial Neuralgia.*—Dr. J. SAWYER, of London, and Dr. E. MACKEY, of Birmingham, extol (*Brit. Med. Journ.*, May 2) the efficacy of tincture of gelseminum, made from two ounces of coarsely powdered gelseminum root macerated in a pint of rectified spirit, for the relief of odontalgia and facial neuralgia. The dose is from five to twenty drops every six hours. Dr. Sawyer says that out of about twenty cases the use of the remedy has not failed to give decided and lasting relief in more than three or four.

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31. *Internal Use of Sulphate of Atropia for Profuse Sweating.*—Dr. FRANTZEL has tested the power of sulphate of atropia in checking profuse sweating in 75 cases in the Charité in Berlin, and is very well satisfied with the results obtained. He gives $\frac{1}{50}$th of a grain in pill, and in only four cases was he required to discontinue it on account of diarrhœa. He uses it not only in the sweating of phthisis but also in that of other diseases, such as acute rheumatism, or convalescence from trichiniasis. The author supposes that it

acts by constricting the small arteries which supply blood to the sweat-glands, the sweating being probably due to relaxation of these arteries. Several observers have shown that atropia produces marked narrowing of small arteries. The dryness of the throat and mouth, and the parchment-like dryness of the skin in the advanced stage of atropia poisoning, are also probably due to constriction of the small arteries.—*Glasgow Med. Journ.*, Jan. 1874, from *Virchow's Archiv*, July, 1873.

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32. *Treatment of Eczema, Lupus, and Cancer by Gurjon Oil.*—Prof. Erasmus Wilson, in a communication made to the Medical Society of London, April 13th, stated that he had used a liniment composed of equal parts of the gurjon oil and lime-water in cases of painful eczema, in lupus, and in cancer, with very encouraging results; and stated that Mr. Hancock had applied it in a case of cancer of the skin with the effect of dispersing tubercles and healing ulceration; but its most useful property was that of relieving pain. Mr. Wilson suggested that this very simple remedy deserved a trial at the hands of the profession, and believed that it would be found a valuable agent of cure in many affections where the skin was painfully attacked.—*Lancet*, May 16, 1874.

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33. *Treatment of Leprosy by Gurjon Oil.*—The Nos. of *The Indian Medical Gazette* for February and March of the present year contain a very interesting report on this subject by Surgeon-Major J. Dougall, M.D. When stationed at Port Blair, India, Dr. D. became deeply interested for the wretched condition of the patients suffering there from leprosy, and finding the existing mode of treating the disease inefficacious, he determined to try the oleo-resinous substance—known in commerce as gurjon oil—obtained in abundance from the *Dipterocarpus lævis* and other trees of allied genera. He tried this oil in various combinations, and he decided that the best mode of using it externally was in the form of an ointment made by violently agitating together three parts of lime-water with one part of gurjon oil until it becomes of the consistence of soft butter. He also used it internally in a thinner mixture composed of equal parts of lime-water and gurjon oil.

The following was the treatment adopted: The patients were made early every morning to wash themselves in a small stream using finely pulverized dry earth as a detergent. They were then given half an ounce of the lime-water and oil mixture internally, and obliged to rub themselves all over for two hours with the ointment. Another dose of the mixture was given in the afternoon, and the rubbing with the ointment repeated.

"Of the 24 cases under treatment here during the past six months," says Dr. D., "every one of them has decidedly benefited by its use, every ulcer without exception has healed up, and not broken out again, but the most marked benefit has been derived by those suffering from the anæsthetic form of the disease.

"The first notable improvement was in relation to the leprous ulcers, which began to heal, and at the same time, anæsthesia gradually diminished." . .

"The change the tubercles undergo in the process of reduction is worthy of notice. After the lapse of some time the tubercle seems to become more movable and loose at the base, and it is felt to be softer there than at the apex. This softening process gradually approaches the surface, and at last a watery bleb forms, and this bleb soon bursts and allows a thin serous clear fluid to escape, and a marked diminution is then observed as regards the size of the tubercle as compared with its former dimensions. This may take place two or three times until the tubercle is quite reduced. I found it expedited matters very much to puncture these watery vesicles with the point of a lancet, and it allowed the fluid to escape without pain or inconvenience to the patient, and did not interfere with the rubbing process. I have seen a tubercle on the helix of the ear entirely subside after one formation of the vesicle.

"The gurjon ointment, though thoroughly rubbed on the surface of the body for four hours every day, produced no vesications directly from its action, and

causes no pain whatever; it seems to be, through its constitutional effects, that the tubercles soften from within outwards. I have rubbed it over my own arm, and it did not cause the slightest pain or redness though allowed to remain on all night.

"The emulsion, as I have already explained, is not disagreeable to the palate, and at first it had no well-marked influence upon the digestive system, but when the dose was increased to one drachm twice a day it improved the appetite, and at the same time acted as a mild laxative.

"It also had a distinct diuretic effect, and the larger does (four drachms) twice a day caused several large healthy motions, in fact acted as a powerful diuretic and evacuant."

Limited as has been the duration of this mode of treatment, it has been long enough, Dr. D. says, to show "that leprosy, both tubercular and anæsthetic, can not only be arrested, but the condition of the lepers can be greatly ameliorated, and men here, who had not for years been able to do more than drag out a miserable helpless existence, are now able and willing to work, and every sore is quite healed. In some instances the sores have been healed up for more than three months, and show no tendency to re-open, and these desirable results have been attained simply by the use of gurjon oil and lime-water, substances which are so cheap as to be within the reach of all. No change whatever has been made even in the most minute particular in regard to the diet of the lepers, from what they have been getting for years past, and they get their fish four times a week as usual. I always thought, and still consider, the men under-fed; still I made no change, in order to avoid complications, and to test the gurjon oil on its merits."

SURGICAL PATHOLOGY AND THERAPEUTICS AND OPERATIVE SURGERY.

34. *Intravenous Injection of Chloral into the Veins for the Production of Anæsthesia in Surgical Operations and also for the cure of Tetanus.*—Prof. ORÉ of Bordeaux communicated to the Academy of Sciences, March 2d, a case in which he induced anæsthesia, in a patient on whom he had occasion to excise the calcaneum for necrosis, by the injection of chloral into the veins. One of the radial veins was opened by a capillary trocar, and a solution of chloral, ten grammes to thirty of water, was slowly introduced, and when twelve grammes of the solution had been thrown in, the patient, whose respiration continued perfectly regular, declared that he felt quite overcome with the desire to sleep. However, the injection was slowly continued until twenty-two grammes had entered the vein, and the desire to sleep had become quite irresistible, the patient resembling a corpse in appearance. Not less than ten minutes were required to produce this result. The operation was now proceeded with, and lasted twenty-five minutes. During the whole time the patient continued in the calmest of sleep, not the slightest cry or moan being heard, and the complete immobility of his features sufficiently indicating the utter annihilation of all sensibility. The respiration continued calm and regular, and, what is remarkable, unattended with those momentary signs of asphyxia which had always been observed in the injections when made in animals, and in the two patients so treated for tetanus. After the operation had been completed, the patient would in all probability have continued for hours in this immovable condition, had not a means of arousing him been tried, which had been found so efficacious in animals—namely, the electric current. One of the conductors having been placed over the left side of the neck, and the other over the epigastrium, after the passage of the current, with forcible and rapid intermissions, the patient awoke, and, sitting up in bed, began talking and shaking hands with everybody around him. He declared that he had felt or perceived nothing whatever. This state of ebriety continued for more than an hour, and was

terminated by crying. He then fell into a quiet sleep, and all anæsthetic effect passed away. "Thus, in this way," Professor Oré observes, "we are enabled to graduate the exact dose of the anæsthetic substance, so as to induce insensibility for as long as may be necessary, and then dissipate the effects at will. Is not this a true solution of the problem of anæsthesia?"

M. Oré feels assured that the complete absence of all irritation of the respiratory organs, as contrasted with what he had observed in his experiments, was due to the precautions he had taken. Believing that the slight appearance of asphyxia, attempts at exspuition, etc., which he had observed in animals at the moment of introducing the chloral, were due to the presence of very minute foreign bodies in the solution, he took the precaution of interposing in the syringe employed in this case a sieve which intercepted even the smallest particles.—*L'Union Médicale*, May 12.

Prof. Oré draws the following conclusions (*La Tribune Médicale*, March 22d, 1874):—

1. That intravenous injections are harmless. In the case communicated there was not the slightest trace of phlebitis. There was only a small abscess caused by the penetration of some chloral into the cellular tissue. M. Oré's experiments on animals has taught him that this always occurs, when a large dose is injected subcutaneously. This leads to the important conclusion for the clinician, that the subcutaneous method is the most defective one for the administration of chloral.

2. A second conclusion is the rapid and long insensibility produced by this substance when it is placed in immediate contact with the blood.

3. Hydrate of chloral injected into the veins rapidly arrests tetanic symptoms. Three injections of ten grains each at intervals of 24 hours, produced with sleep complete paralysis of sensibility and motility. M. Oré particularly insists on the circumstance that a small dose of chloral suffices to produce a favourable result.

Finally M. Oré remarks in order that chloral injected into the veins shall arrest tetanic symptoms, it should be administered in a sufficient dose to almost immediately paralyze the reflex action of the spinal cord, and to momentarily completely paralyze motion and sensibility. The dose of ten grammes at each injection appears to him to be sufficient to produce the effect.

Two cases of tetanus treated by intravenous injections of chloral were communicated to the Surgical Society of Paris (*L'Union Médicale*, April 14th), one by M. Cruveilhier, the other by M. Leon Labbé; in both the result was unfortunate. M. Cruveilhier thinks that the treatment may have contributed to the result in his case, but M. Labbé does not admit that such was the fact in his case; he even believes that his patient might have been saved, had it been possible to have performed a greater number of injections of chloral.

Some remarks made at the meeting of the Surgical Society of Paris, unfavourable to intravenous injections, induced Prof. Oré to send a note to that Society, which was read at their meeting on the 13th of May, and which gave rise to an animated discussion.

Prof. Oré stated (*Gaz. Hebdom*, May 22) that in injecting the solution into the veins, he has never observed the slightest symptom which could give rise to any fear of the coagulation of the blood in the vessels. [This does not seem to us to accord with the statement made to the Academy of Medicine on the 10th Feb. last, by M. Personne, that when chloral is added to fresh blood it completely coagulates the latter; and that the fear that such might occur is not without foundation, seems to be proved by a case related by M. Tillaux, which we shall presently notice.]

Prof. Oré further maintained that intravenous injections of chloral should be preferred to chloroform for surgical anæsthesia.

M. Le Fort strongly protested against this last assertion of Prof. Oré, and maintained that to practise surgical anæsthesia by the injection of chloral into the veins was to exhibit a profound contempt for human life. In so grave an affection as tetanus, when all other measures are powerless, an excuse may be found for bold experiments, but to employ intravenous injections of chloral to

simply produce anæsthesia was monstrous. In this sentiment MM. Verneuil, Duplay, and all the members of the Society expressed their concurrence.

M. TILLAUX communicated to the Surgical Society of Paris, May 6 (*L'Union Médicale*, May 23), a case of tetanus supervening on the opening of a cyst of the liver. The patient had difficulty in swallowing, followed by true trismus. He prescribed the administration of chloral in divided doses, but the swallowing of each dose excited tetanic convulsions, and the next morning on his visit, the patient appeared to be dying; was unable to swallow, and he determined to employ intravenous injections of chloral. This was immediately done, which at once revived the patient and produced the greatest improvement in his appearance. When M. Tillaux left the patient just previous to coming to the meeting, he entertained the strongest hopes of a successful result, and advanced the following conclusions:—

1. That chloral produces an immediate and marvellous effect in tetanus: 2d. That the method of administering it by intravenous injections does not present the dangers and difficulties with which it has been reproached.

At the next meeting of the Society (*Gaz. Hebdom.*, May 22) M. Tillaux stated that, notwithstanding the injection of 20 grammes of chloral at different times, the patient had died, and that the autopsy showed a coagulum extending through the whole extent of the right cephalic vein and the axillary vein as far as the subclavian vein. In the right auricle a white fibrous clot was found which must have been formed before death, and there was another clot in the left ventricle. The blood had a great tendency to coagulate.

M. Verneuil stated that an Italian surgeon had treated varices by the injection of chloral into the veins, with the hope of thus obtaining a coagulum.

M. Forget maintained that there was great danger in every new therapeutic treatment without first thoroughly studying the agent we employ. M. Tillaux's case was a case of experimental surgery. An agent which will succeed in an animal may not succeed in man, and especially a diseased man. A medicament known to produce coagulation of the blood ought not to be injected into the veins for the treatment of tetanus, for it will produce coagulation of the circulating blood.

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35. *Tetanus Treated by Chloral Administered by the Mouth.*—M. CHAUVEL communicated to the Surgical Society of Paris (29th April), two cases of tetanus treated by chloral. One patient took 16 grammes of chloral each day and died at the end of the second day. The other took from the commencement of the disease the same dose every day and died on the third day. In neither case was the chloral of any benefit.

M. VERNEUIL communicated at the same time two cases treated by himself by the same remedy. The first patient took two days after the invasion of the disease 6 grammes of chloral which at once completely arrested the disease, the patient was cured after 25 days treatment. In the second, tetanus supervened ten days after a wound in the head which had almost cicatrized. Ten grammes of chloral were given daily, and the cure was completed in a month. M. V. remarked that it might be objected to his cases that they were chronic; that he thought probable, but he did not think it prudent to wait some days before commencing treatment in order to ascertain whether the progress of the disease was acute or chronic. It may be objected to the administration of chloral by the mouth that some patients cannot swallow. If after administering 15 grammes of chloral no benefit results, M. V. believes it is because the chloral is not pure, or that absorption does not take place from the digestive tube. Finally in some cases the attack is so violent that it is dangerous to wait two, three, or four hours for the effect of chloral administered by the mouth. Some other means of administration must then be sought for. Enemata have sometimes succeeded, but they have the inconvenience of requiring the patient to be moved and consequently tend to bring on the convulsions. Subcutaneous injections are not to be trusted though they may produce temporary relief, and in the treatment of tetanus a very concentrated solution is required, whence result local inflammations. It is easily to be understood then how injections into the veins should have been suggested. The

first to do this was M. Oré of Bourdeaux, but M. V. objects to M. Oré's suggestion of substituting intravenous for other modes of administering chloral. M. V. said he could not inject 10 or 12 grammes of chloral at once into the veins in case of tetanus without feeling great uneasiness, because we do not know in advance what dose may be required to relieve the spasms, and we do know that 2 grammes of chloral given by the mouth sometimes cures at once the affection. Finally, instead of curing tetanus at once, we must suppose that the patient may require to be kept under the influence of chloral for a month; are we then to have the vein exposed during all this time, or every day open a new vein? Trials of this kind should not be discouraged, but it is difficult to admit that the treatment of tetanus should commence by injections of chloral into the veins instead of giving it by the mouth.

In 1868, M. V. had not seen a case of tetanus cured; since that period he has employed chloral and cured 5 cases which give a proportion of $\frac{5}{7}$ cures.—*Gaz. Hebd. de Méd. et de Chirurg.*, May 8, 1874.

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36. *Transfusion.*—Remarks were made on this subject at the third meeting of the Congress of the German Society of Surgeons, by Küster (Berlin), Hasse (Nordhausen), Sander (Barmen), and Berns (Holland). Küster pointed out that the effect of animal blood is not equivalent to that of human blood. He performed direct transfusion from artery to artery as proposed by Schliep in the *Berliner Klinische Wochenschrift*, No. 3, 1874, in thirteen cases from sheep, and in two cases from man. The operation was simple, and never interfered with by accidents, and the wounds healed without any disagreeable occurrence. The general symptoms after transfusion of human blood were rather agreeable to the patient, while after injection of a few ounces of animal blood there followed dyspnœa, cyanosis, pains in the back, and shivering, with rise of temperature. These symptoms, however, disappeared after a few hours; and in all cases he observed better appetite, greater cheerfulness and strength for a short time. All the cases were the subjects of anæmia and chronic diseases. Hasse described the mode of operating with two glass tubes and a piece of India-rubber tube, by connecting the artery of a lamb with the vein of the patient. He had observed good results in about thirty cases in which he had operated. Sander, of Barmen, operated after the method described by Hasse, but warned against the indiscriminate use of animal blood. He had a case where oliguria and uræmia followed the transfusion of lamb's blood in a patient with incipient consumption, who had not suffered before from disease of the kidneys. The symptoms of uræmia lasted four days. The patient survived; but, instead of being benefited by the transfusion, he was worse than before, and showed a considerable loss of weight a fortnight after the operation. Berns related a series of experiments on transfusion performed on dogs and rabbits, and their influence on fever.—*Brit. Med. Journ.*, May 9, 1874.

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37. *Cirsoid Aneurism treated by Injection of Perchloride of Iron; Death from Embolism.*—Notwithstanding the brilliant success which has attended the employment of coagulating injections by some surgeons, Mr. J. F. West regards them as dangerous especially when the tumours are situated about the face and head, and as evidence of this, he relates (*Lancet*, March 21) the following case:—

Alfred G. F., æt. 9 months, was admitted into Queen's Hospital, Birmingham, under his care, June 2, 1873, with a nævoid tumour, about the size of a small marble, on the right ala nasi, near the tip. It had existed from birth, but was slowly growing, and beginning to involve the left ala. It was soft and compressible, and over its surface large and distended capillaries were seen in three or four spots, each as large as a pea. Deformity from the prominent situation of the tumour necessitated operative interference, and as it was considered that no mode of operation offered so good an opportunity for the prevention of an ugly cicatrix as the injection of solution of perchloride of iron, it was decided to use it. At 11 A. M., chloroform having been given, three drops were injected by a hypodermic syringe into the lowest part of the tumour. The child struggled and cried, but there was no other unfavourable symptom. Three more

drops were then injected into the upper part of the tumour, and three at another highly vascular spot, when, on withdrawing the syringe, the child's face changed suddenly to a dusky hue, the hands and feet became blue, the pulse could not be felt, and the breathing seemed to be arrested; on raising the eyelids, the eyeballs were seen to be fixed and turned upwards and outwards, and the pupils were slightly dilated. The tongue was at once drawn forwards, and artificial respiration kept up for twenty minutes. During some part of this time the child breathed naturally, and then would cease to breathe until Silvester's method was again used. Until 6 o'clock the same evening he continued in a half-unconscious state, with a very feeble pulse, dilated pupils, livid hands and feet, and the angle of the mouth on the right side somewhat drawn down. About every ten or fifteen minutes he would start crying, and then relapse into his former semi-comatose state. During the evening the extremities became warmer and of a more natural colour, the breathing less laboured, and the pulse better; but the eyeballs rolled about, and the child could not be roused to take notice, and could hardly be induced to imbibe milk from his bottle. He continued in this state for three days, when he died, with well-marked symptoms of hemiplegia.

At the post-mortem examination, the membranes of the brain were found slightly congested; the anterior portion of both lobes of the cerebrum, and also the inner surface of the brain as seen in the walls of the lateral ventricles, were reduced to a soft pulp, while the posterior part of the brain substance was in a healthy state. A clot was seen stretching from the right internal carotid artery along the middle cerebral artery of the same side. The lungs were congested. The heart contained a small quantity of dark fluid blood. The liver, kidneys, and other viscera were normal.

That embolism was produced in this instance by the injection of the perchloride of iron does not admit of a doubt, and I therefore unhesitatingly confirm Mr. Thomas Smith's opinion that we are justified in rejecting it as a remedy for nævi on the face.

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38. *Ligature of the Femoral Artery for the Cure of Elephantiasis Arabum.*—M. DUMARQUAY, on the 25th March last, exhibited to the Surgical Society of Paris, a woman aged 38, whose left femoral artery had been ligated in 1864 by M. Adolphe Richard for elephantiasis arabum of the left lower limb; the limb subsequently nearly regained its natural size, the skin became supple, and the case was published in the *Gaz. des Hôpitaux* as cured. Subsequently the patient lost the benefit of the operation, and the limb regained its former enormous size. It is thus evident that the announcement of the success of the operation was premature.—*L'Union Médicale*, April 7, 1874. This case affords another proof of the correctness of Prof. Fayrer's opinion that the operation is productive of only temporary benefit.

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39. *Elephantiasis Græcorum.*—Dr. LEISRINK relates a case of this kind in the *Deutsche Zeit.*, vol. iv., in which he tied the femoral artery just below Poupart's ligament. The lady, fifty-one years old, had suffered twenty-five years before from repeated attacks of erysipelas in the right leg, and the latter measured twenty inches round the calf, whilst the sound leg measured only seven. She was considerably weakened by oozing of serum, and four days after the operation the size was reduced to twelve inches. It rose a little afterwards, and although the patient was not actually cured, the disease was certainly arrested and modified. Compression of the artery has been tried in this and other countries with varying success, but amputation has almost always proved fatal.—*Lancet*, April 25, 1874.

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40. *Strangulated Hernia Successfully Treated by Inversion.*—Our No. for April last contains an article by Dr. LEASURE, on the tractile method of reducing strangulated hernia. In the *Indian Med. Gaz.*, for the same month, Dr. THORNTON records a case of oblique inguinal hernia successfully treated by that plan. The rupture had appeared 26 hours before admission into the Arrah Dispensary, and the patient and his friends had made many attempts to return

the protruded bowel, but without success. Severe pain in the part came on during the night, and finding him getting worse his friends brought him to the dispensary early in the morning. The Sub-Assistant Surgeon then attempted to reduce the rupture by means of the taxis with the assistance of chloroform, but he was unsuccessful. Dr. Thornton saw the patient at 9 A.M. He was in great pain and distress, there had been no action of the bowels since the hernia appeared, and hiccup and vomiting had already set in. Dr. T. ordered the foot of his bed to be raised and supported at an angle of 45°, and directed that he should be allowed to remain in that posture, and that no further attempts to return the rupture should be made. The result was that in about twenty minutes the hernia disappeared, reduction having taken place spontaneously.

41. *Volvulus Treated by (Extra-Peritoneal) Abdominal Section; Breaking Down a False Ligament by Manipulation; Recovery.*—Dr. Frederick Betz reports an interesting case of this, and strongly insists upon the importance of a careful examination of the abdomen by percussion and palpation, as soon as we are called to a case of intestinal obstruction. When this is done at an early date, we can generally learn the most tender spot, and the starting-point of the symptoms of obstruction. This information is of great value, not for mere diagnostic purposes, but as a guide, should we subsequently determine upon operation. If called too late, or if we defer this examination too long, it is very difficult, if not impossible, to determine either the site or the kind of the obstruction with which we have to deal, or to feel justified in recommending an operation. Of late, very great progress has been made in the differential diagnosis of cases of internal obstruction of the bowels; and it is to be hoped that abdominal section will be done more frequently, and at earlier periods than heretofore. The following history affords material for more hopeful prognosis in such cases.

A woman, aged thirty-five, had suffered for some years from femoral hernia of the right side. When she was three months pregnant the rupture became incarcerated, but was reduced without any very great difficulty. During the remainder of gestation it gave her no further trouble, and was not even visible. A month after delivery (the night of July 17–18, 1870) she was seized with violent abdominal pains and eructations. Flatus and fæces no longer passed by the bowels. On the 19th Dr. Betz saw her, and found the right hypogastric region tense, convex, distended, and very tender to touch. The left side of the belly was somewhat sunken in, and not at all tender. Fæcal vomiting had set in. The other symptoms remained as before. Over the swelling the percussion-note was dull; elsewhere normal. The pains extended to the loins, and were remittent. There was no external sign of the old hernia. Digital explorations of the crural canal gave great pain. Three possibilities presented themselves; viz. perityphlitis, internal obstruction (from a twist in the bowel), or strangulation in the crural canal. The globular form and board-like hardness of the swelling were against perityphlitis, whilst all the symptoms favoured ileus. The former history and the local tenderness rendered it probable that there was a Littré's hernia, but this tenderness was afterwards found to be only part of the general sensitiveness to pressure. Morphia was given in half-grain doses every six hours. Cold compresses were applied, and water and ice given freely, but purgatives were religiously avoided. Next day (July 20) she was worse; there was less tenderness, but no improvement in either the local or the general symptoms. Pulse 100. Her countenance was anxious. The ileus had now lasted three whole days. Dr. Betz could see no other means of doing good, except abdominal section, with the view either of breaking down a false ligament (band), or of relieving the possible strangulation in the crural canal by withdrawing the coil of intestine from within. After giving chloroform, he made an incision two inches long through the skin, over the crural canal, in a line between the anterior superior spinous process of the ilium and the spine of the os pubis. The fat and fasciæ were divided partly by forceps and knife, partly pushed aside by the fingers. The external crural ring was found to be quite clear. The abdominal wall was then divided down to the peritoneum. Before opening this, he tested the resistance and mobility of the coils of intes-

tine, using a little gentle force. The patient and himself were conscious of a very evident crack or snap, as if some fibres had given way. He was now convinced that the volvulus was produced by a false ligament, situated in the pelvis (horizontal ramus of the pubic bone), and, since one end had given way, it was now possible for the bowel to untwist, and for its patency to be restored. The peritoneum was therefore not opened, but the wound was closed with a compress, and the cold applications were continued. Shortly after the operation, both pains and vomiting ceased. On the 21st, the swelling in the right side was still perceptible, but less tense. Her general condition was improving; she had no thirst. Pulse 80. No fæces or flatus passed. Clysters of Glauber's salt, and milk and water diet were ordered. On the 22d, flatus and a fairly copious, thin, offensive evacuation passed. The tumour was still perceptible, but less tender, flatter, and less elastic. The wound was already more than half healed by the first intention. Her general condition was good. Pulse 80. The clyster was repeated. On the 23d, the bowels acted pretty freely. On August 15 the wound had healed nicely. Further treatment was simply precautionary, as to diet and regimen. On August 31 she still had slight pain when she lay on her left side. She felt a kind of ball in the original spot; and there was frequent gurgling there, as of gas passing through narrow into wider portions of bowel. Deep pressure in the right hypogastric region gave rise to resistance, and one spot was still tender.

It can scarcely be doubted that, after the breaking down of the false ligament, time was still necessary for the untwisting and gradual restoration to health of the agglutinated and convoluted intestines. Hence the subsequent symptoms. Now that three and a half years have elapsed, she is free from all distress, and has no sign of any hernia. The firm cicatrix, adherent to the abdominal muscles, fulfils the functions of a truss. Dr. Betz modestly attributes this successful result to improved methods of diagnosis and recent additions to our knowledge of the etiology of such cases; and remarks that if "delays are dangerous" in external herniæ, they are still more so in internal obstructions.—*Lond. Med. Record*, March 25, from *Betz's Memorabilien*, vol. xviii. p. 493.

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42. *Extirpation of Kidney.*—Dr. G. SIMON reports (*Centralblatt für die Med. Wissenschaften*, March 28, 1874, from *Arch. f. Klin. Chir.* xvi. 48-57) the case of a woman, aged 30 years, who suffered for 18 years from dull pain in the region of the kidney accompanied with purulent and rapidly decomposing urine. Later there was associated therewith from year to year violent attacks of renal colic, which finally became fearfully intense, and continued from 36 to 48 hours. At the same time her constitution began to fail. At times she evacuated with her urine, gravel and grains of phosphate of lime. The patient suffered such tortures that she came over from America to obtain relief by operation. The diagnosis was established. The constant appearance of the pain in the left side and the sensibility of the kidney on pressure, pointed to a local cause for the suffering. Furthermore, the abnormal urine would become during the attack normal, which was to be explained by a stoppage of the left ureter. Prof. Simon also believed that occlusion was excluded, since at no time were there symptoms of the formation of an abscess present. The operation was performed in the way previously described by the author, through the lumbar incision. After laying bare the organ no stone could be detected by palpation, notwithstanding it filled up the entire pelvis of the kidney. The progress of the case was very favourable up to the 21st day; then septicæmic symptoms set in, to which general petitonitis and pleurisy were added, and the patient died on the 31st day. On post-mortem examination the right kidney was found to be enlarged nearly twofold; the left ureter had healed in the cicatrix, and the wound had almost entirely cicatrized. The cause of death must be attributed to septicæmic infection.

Dr. BRANDT, Professor of Surgery in Klausenburg, relates, in the *Wiener Med. Woch.* for Nov. 29 and Dec. 6, an interesting case of the successful extirpation of a kidney after an accidental injury.

S. P., a healthy peasant, aged 25, was, on June 3, 1872, stabbed by a drunken man in the left hyphochondrium by means of a pointed table-knife. Three or

four ounces of blood were lost; and after a while attacks of cough came on, which were attended by a protrusion of a fleshy swelling through the narrow orifice of the wound. Twenty-four hours afterwards he was brought to the hospital, when scarcely any signs of anæmia were observable. Exactly opposite the lower edge of the last false rib there was found a flattish fleshy tumour, of a reddish colour, measuring nine centimetres in length and six in breadth, and from which constantly trickled a transparent, straw-coloured fluid. The edges of the tumour were irregular, as if gnawn, and its under surface was covered by a smooth membrane, in part of a dark-red and in part of a whitish colour. From the middle of this lower surface, a pedicle, six centimetres in circumference, extended into the wound of the abdomen, giving the tumour the appearance of a mushroom. This pedicle was surrounded also by a smooth membrane, which was torn in several places whence escaped some of the above-mentioned fluid. It was firm to the touch, evidently containing vessels, which, however, conveyed no pulsation. The oblique wound in the hypochondrium through which this pedicle passed was about three centimetres in length and one and a half in breadth, having sharp edges, with which it embraced the pedicle. To the touch the tumour was moderately firm and painless (pain only being produced by traction on the pedicle), and its temperature at the surface was lower than that of the rest of the body. The tumour upon the whole much resembled the section made on examining a kidney, and under the microscope the shades of colour characterizing the cortical and pyramidal substances were made out. The abdomen in the vicinity of the wound was quite normal in appearance, but in the left lumbar region there was a remarkable oval-shaped sinking-in. The tumour was very movable on its pedicle when rotated, and this last admitted of some elongation, which, however, produced great pain in the pedicle and the abdomen, but not in the tumour itself. The general condition of the patient was unexpectedly good, the pulse being twenty-four hours after the accident about 80, and the temperature 37.8° C.

The appearance of the tumour and the analysis of the urine which trickled away (which is given in some detail) showed plainly that it was the kidney that had suffered an injury. The organ had evidently been cloven to within its calyces; but what amount of injury the ureter and the vessels had undergone could not be ascertained. It could hardly have been supposed that a knife could have been driven through the abdomen right into the kidney without injury being done to the peritoneum; but the absence of all symptoms proved that such had been the case. After considering at some length the various probabilities of the course the case would take if the kidney were allowed to remain where it was, and of the effects which its removal might exercise on the economy, Prof. Brandt proceeded to its extirpation four days after the injury. The patient, indeed, continued in a very favourable state for the operation, having the day before its performance walked some distance in order to be photographed, occupying two hours in assuming the necessary positions. For the three days prior he had passed little urine, and this contained albumen, derived at all events in part from the injured kidney, which at its injured surface furnished it abundantly. On the day of the operation the pulse was 70, and the temperature 37.6°. The purulent secretion from the injured kidney had considerably increased. A double silken ligature was passed by means of a straight needle through the middle of the pedicle, which was tied in two portions, the kidney itself being separated by means of the knife. No hemorrhage followed. A daily report of the condition of the patient and the quantity of urine secreted is given from June 7 to 22. From this it results that considerably more than half of the urine usually secreted by the two kidneys was furnished at all times by the single one, and on some occasions this amounted to the entire normal quantity. In the whole course of the case no symptoms of an uræmic or peritonitic character occurred. The patient has been frequently seen since his discharge, and continues well.—*Med. Times and Gaz.*, January 24, 1874.

There have been recorded eleven cases of extirpation of the kidney, of which eight died, and three recovered.

The notes of eight of the cases are to be found in the No. of this Journal

for January, 1873, page 277, which, with the one noted below, we have the excellent authority of Surgeon Otis (*Medical and Surgical History of the War of the Rebellion*, Surgical Volume, 2d Part) for saying constitute all the reported cases up to the date of his writing (1873).

Dr. CHAS. L. STODDARD, of East Troy, Wis., reports (*Med. and Surg. Reporter*, 1861, vol. vii. p. 126) the case of a man, aged 58 years, from whom the kidney was extirpated on account of encephaloid disease, the operation having been undertaken in the belief that the mass was a cystic tumour of the liver, and its true nature was not discovered until after the operation was performed. The patient survived fifteen days, and died from exhaustion believed to be due to the extensive suppuration which followed the operation.

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43. *Billroth's Case of Extirpation of the Larynx and Epiglottis; Artificial Vocal Diseases.*—In our preceding number, p. 556, we gave an account of this remarkable operation, and now add a report of the subsequent history of the case as communicated to the *Irish Hospital Gazette* (May 1), by Dr. CARL SCHWAIGHOFER.

The wound healed rapidly, and what after the operation was four inches long, had soon contracted so much as to necessitate the use of the knife to allow of the insertion of a medium-sized canula. In like manner the cavity formed by the removal of the larynx contracted so much that its sides were only kept from contact by the apparatus which was inserted. The effect of the contraction of the cicatrix on the trachea was to draw it powerfully upwards, and thus the wound made in the œsophagus by the operation was considerably lessened. The apparatus invented by Billroth's assistant, Dr. Gussenbauer, consisted of three parts—1. An ordinary Trendelenburg's canula, of large calibre and good length, and having a large oval aperture at the point of greatest convexity. This canula was inserted into the trachea, and fastened in its place in the usual way. 2. A second canula with the same curvature, and just so much smaller as to fit accurately within the first. This also had a large corresponding oval opening. This canula was inserted into the former, but in a contrary direction; that is to say, its inner end, instead of pointing, as that of the first did, towards the trachea, pointed towards the pharynx. In these positions the two oval openings corresponded, and the passage for the air from the trachea to the mouth was free, and the patient could, by closing the opening, breathe through his mouth. That part of the apparatus which was intended to produce the voice, consisted of a short, straight canula, open at one end, closed at the other. In its walls, and exactly opposite each other, were two openings. Further, it was divided down the centre by a partition, in which was inserted the metal tongue which, by its vibrations, produced the voice sounds. This latter canula was inserted into the second, and fixed by means of a sliding-ring. When the three canulæ were in position the openings corresponded; and when the patient closed the outer opening the air was compelled to pass through the third canula, and in so doing to cause the metal tongue to vibrate and thus produce sounds. The patient is, however, able to inspire through the lower opening without causing the metal tongue to vibrate sufficiently to produce a sound. By means of this apparatus the patient can make himself understood in a large room, although, as would be expected, the tone of his voice, though not to say unpleasant, is rather monotonous. He has no difficulty in taking solid food, and it is only when he tries to swallow fluids rapidly, that a drop sometimes falls into the canula; which is, however, easily again cleared by the patient coughing. The man has recovered his former healthy and robust appearance, and as no attempt has been made at the formation of further new growth up to the beginning of March, the man was then discharged from the Hospital, and has returned to his former occupation a living and happy triumph of modern surgery, and, more especially, of the skill and daring of Professor Billroth.

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44. *Resections of the knee.*—According to M. CHERRU the following are the statistics of all the resections of the knee in the French Army during the Franco-Prussian war, and the war of the Commune (1870, 1871). Of 65

partial resections of the knee involving only the condyles of the femur, there were 62 deaths. Of 37 complete resections, involving both femur and tibia, there were 33 deaths and 4 cures. The resection of the knee then was followed by less favourable results than amputation of the lower part of the femur.

M. Penière states in his thesis that of 20 resections of the knee there were 17 deaths; but 4 resections made in Paris during the siege must be added. According to M. Le Fort, of these last four cases three were cured.—*Gazette Hebdom.*, April 17, 1874.

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45. *Tibio-Calcanean Osteo-Plastic Operation.*—M. J. Le Fort describes the following operation as an improvement of Pirogoff's osteo-plastic method. He commences the incision 2 centimètres (.8 inch) below the malleolus externus, and directs it forwards to the middle third of the os calcis. On arriving at this point, the knife describes a curve whose anterior convexity corresponds with the astragalo-scaphoid articulation; as soon as the internal ligaments of the foot are reached, the knife is directed backwards, and stopped at a point 3 centimètres (1.2 inch) in front of the inner malleolus. Then lifting up the foot, he fashions a plantar flap equally convex with the dorsal, passing transversely under the sole of the foot, and meeting the external incision below the outer malleolus. Next, the dorsal flap is dissected up, in order to find the tibio-dorsal articulation, and great care is taken in isolating the flap so as not to wound the posterior tibial vessels. Dividing the ligaments attaching the foot to the fibula, the point of the knife is thrust between the os-calcis and the astragalus, as in the subastragaloid amputation, and the interosseous ligaments are divided. The foot is then separated and dislocated inwards, and the posterior flap fashioned as in Chopart's amputation. In order to disengage the astragalus, it is seized with a strong pair of forceps, and all attachments to the leg are divided. It only remains then to saw the os calcis from behind forward, from which the whole superior articular surface is removed, in such a way as to extend forward close to the articulating surface with the cuboid. Afterwards, all the soft parts being isolated, the articular surface of the tibia and fibula are sawn off, and the cut surfaces of the bones placed in apposition. M. Le Fort maintains that by this method he obtains a firm and perfect basis of support, without the grave inconveniences attending Pirogoff's method.—*Lond. Med. Rec.*, March 25th, from *Gazette Hebdomadaire*, Nov. 7, 1873.

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46. *Fractures of the Skull with Reference to Operative Interference.*—Dr. Corley, Surgeon to Jervis Street Hospital, relates (*Dublin Journ. Med. Sci.*, April, 1874) five cases of fractures of the skull to illustrate the statement of Mr. J. Hutchinson that depression of bone is rarely the cause of symptoms of compression, and defines the cases in which he considers trephining should be avoided and when necessary.

1. *Simple fissure.*—For this fracture the operation should never be performed. True, that accompanying the injury there *might* be localized extravasation of blood; or, subsequent to and consequent on it, there might be formation of matter, which may require the application of the trephine, but the operation then has no reference to the fracture.

2. *Simple comminuted fracture.*—A fracture may be simple externally, but the inner table may be more extensively fractured, and fragments may wound the dura mater or brain. This condition cannot be guessed at until symptoms of intra-cranial mischief arise—for them, and not for the fracture, we may trephine.

3. *Depressed fracture.*—I do not make any distinction between simple depressed and compound fracture as to operative treatment. The latter is more liable to be followed by intra-cranial mischief. As long as no symptoms are present, or *if present, until we have tried all other means of removing them*, we should not operate. If obliged to interfere we do so with little hope, as the symptoms are most likely to own an origin other than the depressed bone.

4. *Depressed fracture comminuted*—including that which is known as "punctured" fracture, such as may be produced by the stab of a pointed weapon, kick

of a horse, or blow of a sharp stone.—In many cases of this description it may be necessary to operate at once, *whether symptoms be present or not.* If the surgeon has reason to believe that in a punctured fracture spiculæ of bone are impinging on the surface of the brain and lacerating it, he is bound to interfere at once. The cause, nature, and position of the injury, and the peculiarities of the symptoms, if any be present, will be all of value in assisting him to arrive at a correct determination. However, in this case—the only one in which I would sanction interference without symptoms—much must be left to the experience and judgment of the surgeon. With reference to this particular point, I shall draw attention to the remarkable cases reported by my colleagues, Drs. J. Stannus Hughes[1] and Meldon,[2] and it will be confessed that they more than justify the latter part of Liston's aphorism—"that scarcely any injury of the head is too grave to be despaired of."

47. *Treatment of Cystic and Fibro-cystic Bronchocele.*—Dr. MORELL MACKENZIE read a paper on this subject before the Clinical Society of London (April 25, 1874). At the end of 1873, Dr. M. had treated 68 cases of cystic goitre, and 19 of the fibro-cystic variety. Of the cystic cases, 54 were cured, 11 were too slight to require treatment, and in 3 instances cardiac disease rendered it undesirable to employ radical treatment. Of the fibro-cystic cases, 11 were cured, 4 greatly benefited, and 1 died, whilst in 3 cases, the disease, being slight, did not call for interference; and 1 patient discontinued attendance during the treatment. In the cystic cases, the cyst was first emptied with a trocar at its most dependent part. A drachm or two (according to the size of the cyst) of a solution of perchloride of iron was then injected and the canula plugged, the iron being left in the cyst; after seventy-two hours, the plug was removed, and the iron solution withdrawn. The plug was then reinserted, and poultices of linseed meal kept constantly applied for a few days (sometimes for ten days or a fortnight) immediately over the cyst. In a few days, suppuration was set up, and the plug was then permanently removed, the canula, however, being allowed to remain in the cyst until the secretion was limited in amount and thin in consistence. The duration of treatment was generally from three weeks to four months, according to the size of the cyst, the usual time being from six to eight weeks; if, however, the first injection were removed too soon, the process might have to be repeated two or three times, and thus the duration of the cure would be prolonged. In the fibro-cystic cases, the cysts were first treated in the manner described, and the fibrous structure afterwards attacked with subcutaneous injections of iodine. In the only fatal case —one of fibro-cystic substernal goitre—death suddenly supervened from the injection of air into a vein. In order to avoid such an accident in future, the author now uses a syringe with a long bent nozzle, which is so constructed that it cannot be completely emptied during the injection. With this precaution, he believes that the risk is entirely removed. Several cases were related in detail, and the following were the conclusions at which the author had arrived: 1. Any cystic goitre which has attained the size of a hen's egg requires to be actively treated, even when the symptoms are not urgent; 2. Smaller cysts, which give rise to serious dyspnœa or dysphagia, likewise require to be treated; 3. The conversion of the cyst into a chronic abscess is the safest and most certain mode of treatment; 4. Suppuration is best set up by injections of the perchloride of iron, as the disposition to hemorrhage is thereby effectually controlled; 5. Injections of iodine (in cystic goitre) are dangerous, because often followed by sloughing; 6. There is a risk in the treatment by injections of iron, from the occurrence of too profuse suppuration when the cyst has been allowed to attain too large a size before treatment; 7. All operations on the neck are attended with the danger of air entering a vein and causing sudden death; 8. This risk is in proportion to the development of the veins, and the propinquity of the tumour to the heart; 9. In pure cystic goitre, the chance of this occurrence is so slight that it may be dismissed from consideration; 10. In certain kinds of fibro-cystic goitre, viz., those in which some

[1] Irish Hospital Gazette, No. 193. [2] Dublin Medical Journal, No. 4, 1872.

of the original gland substance is contained in the cyst, especially in substernal fibro-cystic goitre, the risk is at its maximum; 11. The extirpation of cysts is always attended with great danger from hemorrhage; 12. Extirpation is, nevertheless, justifiable where (the symptoms being urgent) the cyst has attained an enormous size, and has a capacity of several pints, but is not directly connected with the trachea or œsophagus; 13. Extirpation is justifiable where such a cyst has already burst and the patient is in danger from an exhausting discharge. 14. Extirpation may also be employed for the removal of a small but distinctly pedunculated cyst, having, for instance, a capacity of two or three ounces, provided there be no large vessels in its peduncle.—*Brit. Med. Journ.*, May 16, 1874.

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48. *The Contra-indications to the Removal of Melanotic Tumours, derived from the Examination of the Blood and the Urine.*—It is important to know before extirpating a melanotic tumour whether the viscera have also become the seat of the morbid growth or not; and M. Nepveu (*Gazette Médicale*, No. 5, 1874, p. 59) has lately shown that this point can be settled with almost absolute certainty by examining the blood and urine of the patient microscopically. The white corpuscles are found, in cases of visceral implication, to be increased in number, so that with Hartnack (ocular iii., objective 7), fifteen, twenty, or even forty are visible in one field, and they contain, in addition, fine blackish granules of pigment. The serum shows small brownish-red granules, and also flexible granular casts without consistence, and analogous in form to those occurring in the urine in Bright's disease. These, M. Nepveu considers, are moulds of capillaries. The red corpuscles seen *en masse* may have a more or less distinctly pronounced sepia tint.

The urine is darker in colour than ordinary, and assumes a blackish hue if nitric acid or bichromate of potash be added to it. Under the microscope cylindrical masses are seen in the deposit, or else irregular accumulations of brown granulations, like the hyaline casts of Bright's disease in form. If the urine be allowed to evaporate in the air, clumps of fine grayish granules become visible, which surround crystals of various shapes, all of which have a dark hue.

As examples of the application of these facts to diagnosis, M. Nepveu relates two cases. The first was that of a man of thirty, from whose thigh a pigment mark had been removed because it had become irritated by the friction of his trousers. A few months afterwards the glands in the groin enlarged, and an incision was made into them, under the impression that there was suppuration; but instead of that a fungoid growth appeared, which rapidly increased in size, and extended up into the iliac fossa. The blood and urine were examined a little while before the patient's death, and found to have the characters previously described. At the necropsy, metastatic nodules of melanotic sarcoma, resembling the primary tumour, were found in the liver and lungs, in the bones of the cranium and sternum, and in some of the lower ribs. There was not a single nodule in the kidneys, but the whole organs had a slight sepia tint; with one or two pigment spots scattered here and there; so that melanuria does not point necessarily to implication of the kidneys themselves, but only to the presence of a great amount of pigment in the blood, and so to its generation in the other viscera. In a second case one melanotic tumour was removed from a man of fifty-one in December, 1871. In 1872 he had a relapse, and he died in November, 1873. His liver, spleen, kidneys, and osseous system were the seat of secondary deposits, and the diagnostic signs of visceral affection were previously found in the blood and urine.—*Med. Times and Gaz.*, March 28, 1874.

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49. *Extirpation of the Spleen.*—Dr. Watson showed, at a meeting of the Medico-Chirurgical Society of Edinburgh (*Edin. Med. and Surg. Journ.*, Feb. 1874), a spleen "weighing nearly 12 lbs., which, on the 1st November, 1873, he had removed by gastrotomy from a man who had noticed the tumour for more than two years. It filled a great part of the abdomen, displacing the organs. The patient was reduced to a most anæmic condition, and pressed the performance of the operation. The pedicle of the tumour was transfixed by a strong double ligature and tied in two halves. The vasa brevia from the stomach gave much trouble in securing them."

OPHTHALMOLOGY.

50. *Derangements of Vision and their Relation to Migraine.*—Dr. T. CLIFFORD ALLBUTT, in an interesting review (*Brit. and For. Med.-Chir. Rev.*, April, 1874) of Dr. Liveing's work on migraine and some allied disorders, says: "I remember being much disconcerted by the occurrence of hemiopia in my own person about fifteen years ago. I was then scarcely aware of its relation to migraine, and feared some serious bodily calamity. On inquiry I came across the proper history of the symptoms, and have disregarded my few subsequent attacks. My father had migraine severely up to middle life, but myself am and have been wholly free from any form of headache. Take vomiting again. How many of us are acquainted with nervous patients who have periodical attacks of vomiting, which own no obvious cause; are not these very probably to be referred to partial migraine? So much for the limits of variation on the side of partial or milder phenomena, but to know what these limits are in the direction of severity is even more important. Take the following: A gentleman was seized suddenly, first with blindness, of which he complained, then in a few minutes he became aphasic, in a few minutes more he was hemiplegic of the right arm and leg, and perhaps slightly unconscious for a brief interval. Then he vomited freely, and when I saw him had practically recovered. After an anxious consultation his medical attendant and myself ventured to hope that the attack might belong to the migrainous species, though there was no headache. We based this on the rapid recovery, on his well-marked neurotic habit, and on the history of overwork and anxiety. We were probably right; the attacks have recurred some dozens of times in the last five years, and in varying degrees, but have been much reduced in frequency and severity by appropriate medical and other treatment.

"Again, before I left home for my holiday in the summer of 1873, I was most urgently called, with one of my colleagues, to see a lady, about forty years of age, under the following circumstances. She has been subject to migraine for many years. On a Saturday she had complained, as usual, of a bad 'bilious attack.' This lasted during the Sunday, when she was very sick, but she was able to walk from one room to another and give a few orders to a servant. On the Sunday evening, however, when her husband and family expected her to recover as usual, she gradually became lethargic. When I saw her on the Monday she could only be roused with great difficulty, and this to a very small extent. She could not or would not put out her tongue; she was completely paralyzed on the right side, and her eyes presented a conjugate deviation to the left. On the Tuesday she was much the same, save that she showed some signs of returning consciousness, and my colleague and myself were constrained to give the opinion that the case was one of encephalic hemorrhage. On the Thursday I met her husband by chance, and he said she seemed better, but we had a long talk about her apparently sad prospect. She was a lady of great accomplishments, and her right hand was almost her life to her, but I begged her husband to let things alone, and to avoid any active interference, such as faradism, until he had full leave from his advisers. I then left for a month. On my return one of the first patients who walked into my consulting room was Mrs. ——, who entered briskly, smiling and holding out her right hand, which I shook warmly. It was perfectly restored, and she was not only quite well, but very soon after her attack she was using her fingers for the finest art work. A few days then had completed her recovery from a state which certainly seemed desperate, a state, however, which immediately followed a distinct attack of migraine. She had not only been subject to migraine for many years, but twice or thrice in her adult life she had been suddenly struck with aphasia, which, although rather severe at the time, had passed away in a few hours or less. These two cases, and some others of less severity which I have seen, would seem to associate migraine with loss of controlling power in the anterior part of the left hemisphere (*vide* Liveing, p. 96). If subsequent inquiries can prove to us that migraine can put on so grave a form as we have hinted, we cannot make these facts too widely known (*vide* Liveing, p. 221).

51. *Transitory Embolism of the Central Artery of the Retina.*—Dr. L. MAUTHNER refers to a number of cases in which sudden blindness has occurred, but after a time has been as suddenly recovered from. Sometimes these cases ultimately result in permanent and total blindness. The suddenness of the blindness certainly suggests embolism; but it seems difficult under this view to account for the perfect and sudden recovery. The author had the good fortune to examine a case during the period of blindness. A man suddenly had partial loss of vision, which soon became complete. On ophthalmoscopic examination there was perfect anæmia of the retinal arteries, evidently the result of embolism. But in a few minutes the blindness disappeared, and the vessels were found to have returned to the normal condition. This result was evidently not due to the embolus which had obstructed the vessel breaking up, and its fragments being carried into the branches of the artery, because such a condition would be readily enough detected. A very probable explanation is suggested by the author. He reminds us that the central artery of the retina is a branch of the ophthalmic, and that probably in these cases the embolism has stuck just at the off-giving of the branch, this being in accordance with the general fact that emboli usually stick fast at the point of bifurcation of an artery. In such case the obstructing shred would project in part into the ophthalmic and in part into the central artery, obstructing the latter, but probably only partially filling the former. Now the current of blood in the ophthalmic might readily enough wash away the embolus, and the portion of it in the central artery might be drawn out and carried off. The ophthalmic artery is distributed to the skin, and a small embolus in it would not produce very distinct symptoms.—*Glasgow Med. Journ.*, April, 1874, from *Stricker's Medizin. Jahrbücher*, No. 11, 1873.

[We may here refer to the interesting article by Dr. Loring on Embolism in our number for April last, in which he shows that there is reason to doubt whether some cases of sudden blindness ascribed to embolism are really produced by that cause.]

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52. *Treatment of Cataract previously to Operation.*—Mr. CRITCHETT regards it as the duty of the surgeon to warn his patients of the nature of the disease when it has but barely commenced, and when a long and anxious time must elapse before any operation can be attempted. Mr. Critchett, even at the risk of appearing to overlook the true nature of the case, would be reticent, knowing how the thought of impending blindness from cataract is dreaded.

Another question which has to be met is, whether there is any cure, any means of removal by medicine or otherwise, short of an operation. It is at this time that patients with cataracts are apt to fall into the power of quacks and charlatans. Though the answer to this question must be a decided negative, yet there is much that may be done to relieve the present discomfort; for instance, the amount of light may be regulated by the employment of proper glasses, and by the continued use of atropia in solution. It will be well too that the patient should be seen at regular intervals, in case the commencing cataract may be the precursor of some more serious condition, such as glaucoma; and by degrees the knowledge that the increasing dimness of vision is due to cataract and to nothing worse, may in itself be a reason for looking hopefully to the future.

The time for operative interference has arrived when—

1. The cataract is completely matured;

2. The lens of the second eye is also so opaque that the patient is on the point of having to relinquish his occupation.

The social position of the patient must be borne in mind; but the second condition is to be insisted upon, because surgeons of the old school used to delay till blindness was complete, and there is a tendency amongst some surgeons of the present day to adopt the other extreme and to attack every single cataract at once.

There are some cases of cataract which will, Mr. Critchett thinks, always give rise to difference of opinion, and which indeed are embarrassing; viz., when there is very great impairment of vision while the cataract is yet far from

maturity. Is the surgeon to operate upon an immature lens? or is he to hasten the maturity by some operation? The latter course Mr. Critchett believes to be full of danger; and, except in cases where the cortical layers of the lens are much involved, it is, he thinks, the duty of the surgeon and in the patient's interest to wait. In the case where one is cataractous and the other quite sound, Mr. Critchett thinks that in young subjects it is well to operate, but in elderly patients, while one eye retains its perfect power, the cataract in the other should not be interfered with.—*London Med. Record*, May 20, 1874, from *Annales d'Oculistique*, Sept. and Oct. 1873.

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53. *Prolapse of the Vitreous Humour.*—Mr. PIERMÉ in a recent work gives the results of his studies relative to the anatomical changes which take place immediately after the loss of vitreous humour and on the question of its redevelopment, by the light of experiments on animals as well as from its clinical and surgical aspect, and his results are embodied in four chapters. The first chapter is devoted to the normal anatomy of the vitreous humour. The second gives an account of his experiments performed upon rabbits. The third is devoted to clinical observation; and, in the fourth, are summed up the conclusions derived from the preceding three.

The results of the experiments made upon the eyes of rabbits showed that, when a small quantity of the vitreous humour had been removed by means of a small syringe, the operation was a very simple one, and was attended by no evil consequences, no hemorrhage, nor any inflammation of the coats of the eye. Thirteen such experiments are recorded, and in all, the eye, which was soft and somewhat shrunken after the operation, in a few hours had regained its normal tension and appearance. The author asks whether, in these cases, the vitreous humour reproduced is identically the same, or, merely a new substance, more or less resembling that which had been lost; and he feels inclined to admit the reproduction of a veritable vitreous humour, and for the reason that the fluid removed from the vitreous chamber is the structureless and albuminous fluid which is again speedily reproduced from the surrounding bloodvessels. M. Piermé even admits a renewal to a certain amount of the nucleated cells described by Iwanoff. Surgical experience shows that a man may lose vitreous humour in consequence of a wound of the sclerotic, and in a short time the eye may regain its normal appearance and may retain its sight; and it has been the experience at some time or other of most surgeons, that on the day following a cataract operation, during which vitreous humour has been lost, the tension of the eye has been completely restored. It is, however, probable, that such eyes are never so sound or so well able to withstand disease, as those which have passed through the operation without accident. The case is far otherwise, however, when the loss of vitreous humour has been considerable; there is then the risk of choroidal or retinal hemorrhage with detachment of the retina perhaps, or, in the instance of a cataract extraction, the fragments of the cortical substance which are retained in the eye may become the exciting cause of proliferative changes, and take the shape of suppuration, or of membranous opacities which must prevent useful vision.

The conclusions arrived at by M. Piermé are as follows:—

1. The vitreous humour is reformed readily and speedily both in the eyes of man and of the lower animals.

2. Prolapse of the vitreous humour is of greater danger when the wound is large, and naturally the gravity of the accident is greater in proportion to the amount of the loss.

3. The vitreous humour may become the seat of an inflammation in consequence of a wound, and this inflammation may terminate by resolution, by suppuration, or may become chronic.

4. The immediate evil consequences of prolapse, generally have their origin in the choroid; and the ultimate result is atrophy of the eyeball.—*London Med. Record*, May 20, 1874.

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54. *Foreign Bodies lodged within the Eye.*—Mr. C. S. JEAFFRESON, Surgeon to the Eye Infirmary, Newcastle-on-Tyne, makes (*Med. Times and Gaz.*,

March 28, 1874) some judicious remarks on this class of accidents. "There is one rule in ophthalmic surgery," he says, "which will help us to deal with a large class of these cases, and it is this: *That an eye which has been damaged by accident or disease, and which is no longer useful for visual purposes, is a dangerous organ, and should be removed.* I do not wish to assert that this rule should always be rigidly carried out as regards eyes which have been destroyed by idiopathic disease, although I think, in these cases, a rigid conformity to it would rarely carry us astray. In traumatic cases I firmly believe that it can never safely be departed from, and should be carried out as soon as we have convinced ourselves that the visual power is gone, or will be so low as to be practically useless. Sarcely a day passes in my public and private practice without my seeing a case of sympathetic ophthalmia, which might have been averted had this rule been thoroughly understood by the bulk of practitioners; and every year a large number of persons are consigned to a life of darkness and misery from a want of appreciation of the importance of it. Patients have a great horror of enucleation, and require usually a great deal of pressing to submit to it; and for this reason the surgeon must be firm and unflinching, and must indicate the necessity for action in the most forcible language.

"Now, in by far the larger number of cases in which foreign bodies are lodged in the deeper parts of the eye, the visual power will have been destroyed immediately, or will certainly depart after a few days, and it will only be in exceptional cases that difficulty will arise in determining what should be done.

"Sometimes we may have an opportunity of extracting the foreign body, and there are some few cases on record where intruding substances have been extracted from the vitreous chamber, but it rarely happens that the combination of circumstances is sufficiently favourable to allow of this course being pursued. In my experience the vitreous becomes very quickly turbid after an injury, and the chance of extraction is slight, unless the patient is seen almost immediately after the accident, and when the position and relation of the foreign body can be unmistakably made out. Indiscriminate fishing for the intruding substance (a practice I have seen adopted more than once) is much to be deprecated, and can lead to no good results. Sometimes we may have strong reasons, from an examination of the track of the wound and other circumstances, for suspecting that the foreign body lies in a certain position, although we may not be able to see it. It is then justifiable to make a small incision in the sclerotic over the suspected spot; and cases are on record where this has been done with success. I need scarcely say these operations should never be undertaken by persons wholly unpractised in the delicate manipulations of ophthalmic practice. When patients are seen soon after an accident, it seldom happens that there can be much difficulty in deciding whether a foreign body is embedded in the vitreous or not, especially when it has passed through the cornea and iris, or lens, and there is little blood effused. It may be more difficult to diagnose between simple penetration and lodgment when the wound is made directly through the sclerotic, as we naturally miss the visible evidence of wounded intraocular structures.

"What should, then, guide our treatment in doubtful cases? In my opinion the following circumstances:—

"1. If there are the slightest signs of sympathetic ophthalmia in its fellow, the injured eye should be immediately excised.

"2. If vision is absolutely lost beyond hope of recovery, the eye should be sacrificed.

"3. If the wound is in the ciliary region, and there is no prospect of really useful vision, the eye should be excised.

"4. If the wound is not in a dangerous region, and the impaired vision seems to be in a great measure due to effused blood, I should not advise immediate operative interference.

"When once we have made up our minds that enucleation is necessary, is it advisable to wait till acute inflammatory symptoms have in a measure subsided? For my own part I think not. I have frequently performed enucleation during the most acute inflammatory stages, and I never have seen any bad

results follow. I believe by following this rule we may frequently curtail a great deal of pain and anxiety which would have been incurred by waiting.

"When foreign bodies are lodged in the anterior chamber, lens, or iris, they are generally clearly visible, and may usually be removed without much difficulty whilst the structures are still transparent. When they are lodged in the lens, no time should be lost, for sometimes it happens that a body which remained *in situ* whilst the lens was firm, disappears behind the iris when the lenticular matter becomes diffluent, and, if extraction be attempted at this period, special care must be employed, as the lenticular matter not unfrequently flows out, leaving the foreign body hidden by, or entangled in, the folds of the iris.

"Occasionally a foreign body which has been lodged in the eye will escape spontaneously."

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55. *Tubercular Ulceration of the Conjunctiva.*—DR. H. SATTLER, Assistant at Prof. Arlt's Ophthalmic Clinique, reports the following case of this hitherto unobserved disease:—

The subject of it was a tall, spare, pale man, who, according to his own account, had until lately been perfectly healthy. When I first saw him he was under treatment at Prof. Schrötter's Laryngoscopic *Clinique*, for a hoarseness of which he had been complaining for the last six months. In the course of the previous two years he had often had a cough. He had now been complaining frequently, for some months, of a burning sensation in the left eye. Upon examination I found the lids of this eye somewhat red and swollen, with numbers of dilated veins visible through the integument. The semilunar fold of the conjunctiva was very swollen and red, and the bulbar conjunctiva slightly injected, while the cornea and the deeper parts of the eye were perfectly normal.

The conjunctiva of the under lid was uniformly red and velvety. Scattered over it were several small ulcers, the largest being oval in shape, and measuring two lines in its long and one line in its short diameter. These ulcers had sharply cut margins, and their floors were covered with a grayish exudation. There was little or no inflammatory reaction in the conjunctiva surrounding the ulcers.

The upper lid was enlarged in every dimension, and flaccid. The entire retro-tarsal fold, as well as the conjunctiva covering the upper portion of the lid, was occupied by one extensive ulcer, the floor of which was hidden by a yellow, creamy exudation, its margin being jagged and sinuous. That part of the conjunctiva which the ulcer had not attacked was greatly injected, and the papillary bodies swollen. Towards the inner angle, the ulceration extended slightly on to the bulbar conjunctiva, as well as to the semilunar fold. Its boundary in this direction was not well defined, and here, too, the conjunctiva seemed swollen from infiltration.

Owing to the extreme rarity of tubercular ulcers of the conjunctiva, suspicion was directed to syphilis as the fundamental disease; and, in fact, the ulcers were at first regarded as being of secondary syphilitic nature. At the same time it was not possible to obtain any certain sign of previous syphilis either from the anamnesis, or from objective appearances on the body of the patient. The ulceration in the larynx was at once recognized as tuberculous by Prof. Schrötter, and the further progress of the case, too, spoke decidedly against syphilis. The ulcers of the conjunctiva were painted with a solution of corrosive sublimate, and touched with solid nitrate of silver at intervals of three or four days, while, a little later on, some mercurial inunctions were administered. The patient, however, became more debilitated. A healthy condition of the surface of the ulcers could not be attained; on the contrary, they extended more to the bulbar conjunctiva, and fresh ulcers formed upon the under lid. The way in which these formed was characteristic. At first a pale grayish and slightly prominent point appeared in the conjunctiva; gradually this became more of a yellowish shade, and then became abraded on the surface, producing an ulcer about the size of a pin's head, which slowly increased in size, and became confluent with others in the neighbourhood.

The patient's death took place about six weeks after he came under observation, and the autopsy removed all doubt as to the true nature of the affection.

No trace of syphilitic products could be found. In both lungs, besides old star-shaped, depressed cicatrices, there were yellowish, cheesy masses distributed; some solitary, and some collected in groups. In the cœcum and ascending colon extensive ulcers were found, the margins of which were steep and sinuous, and in their neighbourhood were many of those yellow cheesy masses. The free margin of the epiglottis presented the appearance of having been gnawed away, the cartilage being here and there laid bare. The mucous membrane on the inner wall of the larynx was ulcerated.

The microscopic examination of the conjunctiva was most interesting, and showed a condition highly characteristic of tubercular disease. There was an intense cellular infiltration of the conjunctiva. In the tissue of the membrane itself, as well as in the subconjunctival cellular tissue, distinctly circumscribed collections of round cells were found, the cells lying very close together. The periphery of these cellular aggregations became much more readily coloured with carmine than their centres. A careful examination showed, then, that the cells in the periphery were rich in protoplasm and contained several nuclei, while the centre was occupied by small cells having but one nucleus, by the shrunken remains of cells, or by detritus. The deeper lying aggregations of cells contained only well-formed elements, but the nearer the surface they lay, the more certain could one be of finding retrogressive changes in them. By the decay of these superficial aggregations the ulcers were produced, and the rapid extension of the latter was caused by the formation of fresh centres upon their floors and margins, as well as by the diffuse cellular infiltration which abounded. The ulcers penetrated deep into the upper lid, involving the Meibomian glands. The inflammatory reaction in their neighbourhood was but very slight, and there seemed to have been no attempt made at reparation of the loss of substance. With regard to the origin of the circumscribed cellular aggregations, I may say that some of them seemed to be simply hyperplastic lymphatic follicles (or trachoma glands), in the centre of which necrosis had come on. I ascertained also the origin of others beyond doubt from a circumscribed proliferation of the corpuscles of the adventitia of the small arteries and capillaries; which coincides with the observations made on the formation of tubercle in the pia mater, and in some other places.—*Irish Hospital Gaz.*, April 1, 1874.

MIDWIFERY AND GYNÆCOLOGY.

56. *Twin Pregnancy in a Double Uterus.*—Dr. Perrault relates a remarkable case of this in a woman 20 years of age. Labour being slow and the pains absent, version and subsequently application of the forceps to the after-coming head were resorted to. The abdomen was still large, and twin pregnancy was diagnosed. The placenta not separating, the hand was introduced and it was removed, and in searching over the fundus an opening was found in its upper and median part. Then, he says, he found another cervix uteri projecting into the uterus, just as the cervix projects into the vagina. Through this a second fœtus was felt presenting by the shoulder. Version was performed, and a second fœtus weighing 9½ lbs., removed. By a subsequent more complete examination M. Perrault convinced himself "that there were really two superimposed uteri, each with its distinct neck, and that the two fœtuses could not even have had direct relations with one another during their intra-uterine life, the one being placed in an inferior, the other in a superior compartment." The patient died of puerperal fever, but no autopsy was allowed to clear up this apparently inexplicable case.—*Brit. and For. Med.-Chir. Rev.*, from *Lyon Médicale*, Aug. 31, 1873.

57. *Spurious Pregnancy with Labour.*—Dr. Underhill reported the following curious case of this to the Obstetrical Society of Edinburgh, Jan. 28th, 1874. Previous to marriage the patient's (æt. 23) menses had been always

regular, painless, and lasted about four days. She was married in January last, menstruated in February as usual, and since then has seen a very small quantity of discharge every month or six weeks, seldom lasting more than a day, or being more than enough to stain one cloth. The discharges were not quite regular, and were sometimes accompanied by pain. In March, April, May, and June, she was sick, and vomited every morning, the sickness passing off about midday. From this time her belly began to swell, so that she several times found it necessary to let out her dresses. She has been feeling the movements of the child for several months, but does not know when she first felt them. Her breasts have also enlarged, but not very much.

On Nov. 13th Dr. U. was sent for in the morning and found her sitting up. "She said she had had pains off and on since the Monday, and had had a considerable 'show.' She also stated that the pains were coming on now about every ten minutes, had been bad all night, but were better in the morning.

"I was sent for again about 2 P. M., and found her lying on the bed undressed, and as I entered the room she was apparently in the middle of a violent expulsive pain. She was crying out lustily, and biting a handkerchief between her teeth to prevent her cries being heard, while at the same time she was pulling hard at a cloth attached to the bedpost by way of helping the pains. I was told that pains of similar severity were coming on every five minutes or oftener. She complained mostly of pain round the back and loins, and some little in her belly. I saw another pain very similar to the first I had seen, and then tried to make a vaginal examination, fully expecting to find labour well advanced. I found great difficulty in introducing my finger, owing to a most determined contraction of the thighs together, and as soon as I touched the vulva, she threw herself round on her back, struggling and shrieking loudly. She declared that the mere touching of the vulva gave her great pain in the back. The sphincter vaginæ was in a condition of spasmodic contraction; but, by determined persistence, I at length managed to reach the os, and, to my surprise, found it quite virginal, small, round, and hard; the pelvic brim was not occupied by any swelling or hardness, but all the parts felt quite natural. In fact, neither pregnancy nor any condition of disease could be made out by the finger. On examining the abdomen, it was found to be moderately distended in its lower part, but not nearly large enough for a full-time pregnancy; it was resonant to percussion all over, but the tapping caused her to wince and cry out as if in pain. I then made gentle pressure towards the pelvic cavity, and while engaging the patient in conversation, pushed in my hand, so that I could feel the promontory of the sacrum, and satisfied myself that the cavity of the pelvis contained no tumour large enough to be felt from the outside. On examining the breasts, I found them full, but not hard, with a light-brown areola, but the nipples were small, and not puffy, or in any way resembling the nipple of pregnancy. I told her at once that she was not pregnant, and that the whole thing was a mistake; and afterwards, though she complained of soreness and pain round the back, she had no more of the imitative throes of labour.

"Thinking that there might be some vaginismus from the difficulty I had found in examining her, I asked her, and she stated that connection gave her great pain occasionally, but not always; and from her husband I learned that connection was perfect, and, as far as he knew, without any pain to her, and that at least she complained of none.

"The next day she was sitting up, the discharge still went on, but beyond a little soreness in the back, she was quite well. A dose of laudanum had given her a quiet night. Such are the facts of this case."

"The peculiarity of this case," Dr. U. remarks, "seems to be, that the patient is a young woman of good sense, and not at all of an hysterical character; that she was induced to believe in the existence of pregnancy by the opinion of her medical man, somewhat against her own judgment. She had some doubts about the pregnancy all the way through; that this notion had fixed itself in her mind; and that when a more than usually powerful stimulus to the sexual organs had arisen in the form of a delayed and, for her, unusually copious menstrual discharge, this notion had exploded in the pains of a simulated labour. The imitation of the labour-pains was very striking, the more so, as I found

subsequently that the patient had never seen a woman in labour. In the words of Hamilton, as quoted by Montgomery, 'She acquired the most accurate description of the breeding symptoms, and with wonderful facility imagined that she felt every one of them.'"

Dr. DUNCAN said he had seen many cases of spurious pregnancy, but only one of spurious labour. This was a lady who had borne five children previously. The menses had stopped, or rather, there was a scanty discharge, and at the wrong time. The abdomen was greatly distended. He received a pressing message to go to the lady, but being out of the way, a second most pressing one came. His diagnosis was, on examination, that the whole thing was a mistake—there was no pregnancy. The lady was quite incredulous. She was no novice, having borne five children previously; she knew the symptoms well. Still, as before said, there was no genuine pregnancy—no living product. This lady, Dr. Duncan added, kept up the delusion well, and made her friends believe that she had really given birth to a child, but that it was still-born. Dr. Underhill might have entered more profoundly into the interesting subject—and it was really interesting. There were various degrees of it. For example, there were some who merely exhibited the symptoms of pregnancy, and these symptoms never culminate in spurious labour. Were it not for the undoubted fact that some of the lower animals, such as bitches, exhibited spurious parturition, he would be inclined to deny it altogether. As it was, the thing could not be challenged—it was no mistake or delusion—at least, barring a few cases; but a reality, and, in fact, a disease. Dr. Duncan desired to emphasize that a distinction should be made betwixt those cases where there was merely spurious pregnancy—that was to say, where women fancied themselves pregnant—and those where this fancied pregnancy culminated in a fancied or spurious labour. Authors had not sufficiently attended to this distinction.—*Edinburgh Med. Journ.*, March, 1874.

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58. *Post-partum Hemorrhage treated by the Application of the Solid Perchloride of Iron to the Interior of the Uterus.*—Dr. A. H. RINGLAND communicated to the Dublin Obstetrical Society, March 14th, a paper on this subject. Having referred to the arguments for and against the use of the perchloride of iron in cases of *post-partum* hemorrhage, and also to Dr. Barnes's admission, that in the fluid form, as he and others use it, the styptic may not be entirely free from danger, the author said that in the employment of iron in a different form from that hitherto recognized, he was indebted in a great degree to accident, and to the fertile ingenuity of Mr. Weir, the Resident Medical Officer of the Combe Lying-in Hospital. In an extern midwifery case, on which that gentleman and the author were in attendance, and in which the application of the perchloride of iron was immediately demanded, neither the solution, nor the necessary apparatus for its employment, was at hand. Mr. Weir, however, happened to have some of the solid salt with him, and he suggested the feasibility of introducing with the hand a small piece of the solid salt, and painting therewith the bleeding surface of the uterine cavity. It was at once so employed; the hemorrhage was instantaneously stayed, and the case terminated favourably. This occurred in October, 1871. So successful was the result thus obtained, that since January, 1872, in twenty-three cases in which the use of the perchloride of iron to the interior of the uterine cavity was absolutely necessary—out of a total of 4500 deliveries, three-fourths of which were extern—the same method was adopted. Dr. Ringland gave, in chronological order, the particulars of each case in which the styptic was thus used, from which statement it appeared that out of the twenty-three cases, fourteen recovered well; three made tedious recoveries (one patient being the subject of constitutional syphilis, and the other two being threatened with pelvic cellulitis). There were six deaths. Two cases died, one within two, and the other within three hours after delivery. One patient, in advanced pulmonary consumption, died on the ninth day from phlebitis; another death from pyæmia could be adequately accounted for by a portion of the placenta being morbidly adherent, which could not be removed. In the remaining two fatal cases, the placenta was also adherent, and death took place in each, apparently from sinking of the vital powers. No

post mortem could be obtained in any of the fatal cases. Dr. Ringland did not think that death could be fairly attributed to the use of the styptic in these cases. Out of the entire number (twenty-three), all, or at least a very large proportion of them, would have died, were it not for its employment; every means known to science having been previously adopted in each case respectively, but without avail. Every patient was running down rapidly, a fatal result appeared impending, and the styptic was only applied when the patient was almost *in extremis;* and yet, of the whole number, only four (excluding the first two cases) succumbed after its application. The first duty of a medical man, Dr. Ringland believed, was to tide over the immediate danger, irrespective of future contingencies; the more especially as such are, as demonstrated in the cases submitted, only exceptional, and when they do arise are in many instances amenable to treatment. The first pressing duty is to save the woman from dying. The case is, that other means being exhausted, she would die unless local styptics be applied. Where, then, is the force of the objection, that these styptics may do ulterior harm?

Dr. T. MORE MADDEN had injected the perchloride of iron in ten cases of *post-partum* hemorrhage, since January, 1870. He did not assert that this mode of arresting such hemorrhage was safe or efficacious in all cases; but it was more efficacious than any other remedy we possessed. Having referred to the advantages and disadvantages of the procedure, Dr. More Madden went on to give, in detail, the history of the cases in which he had used it. In nine cases the hemorrhage was arrested at once. In one case the injection failed. Seven of the cases recovered; three died, but death was in no way connected with the injection of the perchloride. He, Dr. Madden, considered that Dr. Snow Beck had fallen into the error of mistaking the *post hoc* for the *propter hoc*, as regards the occurrence of deaths consecutive to the injection of the perchloride of iron. Dr. Madden also thought that the remedy was often abused; and was of opinion that its use should be restricted to the treatment of those cases in which the ordinary hæmostatics had failed. In conclusion, Dr. More Madden referred to the practice of the Dublin School of Midwifery, in (1) the proper management of the second stage of labour; (2) the following of the uterus down with the hand; and (3) in giving ergot when the head was on the perineum, as being valuable means of obviating the tendency to *post-partum* hemorrhage.

Dr. M'CLINTOCK said that when this subject had been brought before the Society over three years ago by Dr. Roe, it had not assumed the great importance it now possessed. Ergot, cold, the internal and external manipulation of the uterus, and electricity, were all powerful agents in arresting *post-partum* hemorrhage. There were three important practical points connected with the use of the perchloride of iron, which recommended it to our notice. viz., (1) its feasibility; (2) its efficacy; and (3) its safety. Those cases in which there has been the largest losses of blood are the most likely to prove fatal; therefore, a fatal result should not always be attributed to the action of this styptic. The only case in which death could, he, Dr. M'Clintock, believed, be fairly set down as due directly to the remedy, was the case referred to by Dr. Bantock in the late discussion at the London Obstetrical Society, in which the iron was used, not to arrest, but in order to prevent hemorrhage. In this case the injection may have escaped into the peritoneal cavity, and have caused the intense pain which lasted until the patient's death. As to the solution used, he, Dr. M'Clintock, employed the liquor ferri perchloridi fortior, diluted with three or four parts of water, which was equivalent to the weaker fluid of the Pharmacopœia. Dr. A. H. Ringland's cases should be excluded from the category of cases under consideration, both on account of the remedy that was used, and the mode of using it. The introduction of the hand into the uterus was *per se* a most powerful means of stimulating that organ. Dr. M'Clintock had injected the perchloride of iron in four cases of *post-partum* hemorrhage. Three of these cases were successful. In the fourth case the hemorrhage was followed by appalling exhaustion, not proportionate to the amount of blood lost. The patient died three hours after delivery. If the uterus is occupied by clots, they should be removed before the injection is used, as otherwise the styptic cannot

come in contact with the bleeding surface. This was not sufficiently attended to in the last case, which, probably, was the reason why the injection, though repeated, did not succeed in arresting the flow of blood.—*Irish Hospital Gaz.*, April 1, 1874.

59. *Use of the Chloride of Iron in Post-partum Hemorrhage.*—Dr. Lombe Atthill read before the Dublin Obstetrical Society, March 14, 1874, an interesting paper on this subject, and relates five cases in his private practice, in which he resorted to that mode of treatment, and makes the following comments on the class of cases in which the injection is most likely to be useful, and as to its subsequent effects on the patients:—

1. It is noteworthy that the only cases which seemed in my practice to demand this treatment were women in a previously bad state of health. Case No. I. was that of a lady who not only suffered from sickness to an excessive degree during pregnancy, but who for a long time previous to, and of course also during her pregnancy, consumed almost no food, and what she did take was of an improper character. No. II. was markedly anæmic. No. III. was in such bad health as to cause much alarm to her friends on this account prior to labour. Cases Nos. IV. and V. were the same patient. She, too, was on both occasions in a very bad state of health—so bad, indeed, that the induction of premature labour seemed more than once demanded. In all it may be fairly assumed that the blood was in an abnormal condition, probably destitute of its proper proportion of fibrine. This seems specially likely to have been so in Case II., in which, though the uterus contracted fairly, the hemorrhage continued.

2. As to the results: In three of the four patients pregnancy subsequently ensued; this fact proves clearly that the injection of the perchloride of iron in no way injured the uterus.

In four of these five cases, notwithstanding previous bad health and the great loss of blood sustained at the time, no unpleasant symptoms of any kind subsequently presented themselves. In one case death ensued. Taking into account her previous ill-health and the acknowledged tendency which always exists to the occurrence of peritonitis after excessive losses of blood, it hardly seems a reasonable inference that in her case death was due to the effects of the injection of the styptic. The Society have, however, before them all the facts which I am possessed of, for no *post-mortem* examination was possible. My own opinion is that this patient would probably have died whether the perchloride had been injected or not. Pyæmia, phlebitis, and peritonitis have, as is well known, carried off numbers of patients who have suffered from *post-partum* hemorrhage, long before the injection of a styptic for its arrest was proposed, the debility resulting from the loss favouring the occurrence of these forms of disease; and in the case of the patient under consideration, the state of her health previous to labour aggravated the danger, to which all cases of hemorrhage are liable. But even were it proved that her death was the result of the use of the perchloride, a further question has yet to be decided—namely this, believing as I did and still do, that this patient would have died from hemorrhage, and that in a few minutes, was I justified in using an agent which alone, in my opinion, was capable of saving her life? supposing it to be proved that in a certain proportion of cases the use of that remedy would be followed by fatal results.

This question seems to me to be identical with that which is involved in deciding on all capital operations, notoriously in that of ovariotomy, and that it must be decided on the same principles. I shall not, therefore, discuss it further.

For myself I have arrived at the following conclusions:—

1. That cases of *post-partum* hemorrhage occur in which the injection of the perchloride of iron, or some similar styptic, is alone capable of arresting the hemorrhage.

2. That the injection of such styptic does not necessarily increase the tendency which exists in such cases to the occurrence of pyæmia, septicæmia or peritonitis.

3. That this treatment is specially applicable to anæmic patients.

4. That while it should never be had recourse to unnecessarily, it should not, on the other hand, be delayed too long.

I may add that in using the solution of the perchloride of iron, I carry out in the main the directions given by Dr. Barnes. I have not, however, in any case injected more than six or eight ounces, sometimes as little as four ounces of the fluid. I also use it somewhat stronger than he does, namely, in the proportion of one part of the strong liquor, B. P., to two of water. The important point in using it is to take care that the end of the tube is passed up to the fundus of the uterus, and that the fluid be injected slowly. I should add that I have not met with any case in which the uterus did not immediately contract firmly on the perchloride being injected. I am inclined to attribute this to the fact that I had recourse to the remedy before the powers of the patient were so exhausted as to render the uterus incapable of responding to the stimulus.—*Dublin Med. Journ.*, April, 1874.

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60. *Fatal Result of Injection into the Vagina.*—M. LORAIN records an interesting observation of an injection into the vagina followed by death. The patient was a young girl, sixteen years of age, who was suffering from vaginitis, probably of a blennorrhagic character. After an emollient treatment, consisting of baths and injections of decoction of marsh-mallow, as the surface of the vagina could not be painted with a brush filled with solution of nitrate of silver, M. Lorain gave directions that a weak solution of the nitrate should be injected. This was accordingly done at 10.30 in the morning, with a small syringe containing scarcely five centigrammes of the fluid. The quantity of the solution injected only contained one decigramme (1.54 grain) of the nitrate, and it was thrown in with due care. Violent pain was immediately experienced. The patient displayed the most marked agitation. Ice was applied over the belly and to the vagina. The temperature of the vagina was 37.8 C. The following day the temperature fell to 37.2, but vomiting occurred. On the three succeeding days the condition remained unchanged. Stomatitis then supervened, resembling closely that produced by mercury. On the fifth day after the injection death occurred suddenly at 7 P. M. M. Lorain attributes the accident to the penetration into the peritoneum of a few drops of the pus proceeding from the passages and Fallopian tubes consequent on the writhings produced by the pain. A post-mortem examination made by M. Tardieu showed that there was metritis with suppuration. The *tubæ* were filled with pus, some of which had flowed into the peritoneal cavity and produced a diffused peritonitis. M. Lorain cites a number of other cases in which a similar accident had happened. He thinks that every woman attacked with vaginitis, accompanied by symptoms showing that the ovaries and Fallopian tubes are affected, is in great danger. The care of the practitioner should be directed to the prevention of all excitement on the part of the patient. Pain should be allayed by opiates and by hypodermic injections, the bowels kept open by means of emollient injections and sitz baths, whilst the abdominal walls should be supported and rendered immovable by a corset of elastic collodion; and, finally, no examinations should be made beyond those that are absolutely required for the purposes of diagnosis.—*The Practitioner*, March, 1874, from *Bull. Gén. de Thérapeut.*, No. ii., 1874.

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61. *Syphilis communicated by the Finger of a Midwife.*—M. BARDINET read a paper at a recent meeting of the Academy of Medicine which created a sensation. The following is a summary of the communication. Early in 1873 the town of Brive was in the enjoyment of a good sanitary condition, and the results of confinements being especially favourable, when it became known that some women recently delivered were the subjects of syphilitic symptoms, which were participated in by several of their husbands and infants, some of the latter dying in consequence. Discords arose in families that had borne unexceptionable characters. After a while it was discovered that all the women who had so suffered had been attended by the same midwife, and that this midwife had a bad finger, there being an ulcer at the edge of the nail, traces of which still

existed a twelvemonth afterwards. How this ulcer arose she could give no definite account, but some time after its appearance she became ill and emaciated, exhibited a scaly eruption, lost her hair and eyebrows, and suffered much from neuralgic pains. Shortly after her husband exhibited very similar symptoms. During eight months, between February 28 and October 29, fifteen women whom she attended became ill, to which number have to be added eight of their husbands and nine of their infants—*i. e.*, thirty-two individuals. This is, however, very far short of the entire number, the majority of the persons affected refusing to incur publicity by avowing the fact. From the inquiries which he made among the practitioners of the town, M. Bardinet believes that he is justified in considering the total of the cases to exceed one hundred. The practitioners of the place at once recognized the nature of the affection, and several of the persons affected pursued the midwife in a court of law. In March of the present year she was sentenced to two years' imprisonment and a fine of fifty francs.

M. Bardinet was employed by the court to examine into and report upon all the medical facts of the case. He found that towards the end of the first month after delivery, oftener during the second month, and sometimes during the third, a more or less abundant pustular eruption had appeared, commencing at the genital organs, and extending over the whole body. This was followed by lassitude, neuralgia, pains in the joints, desquamation of the palms of the hands and soles of the feet, and in almost all the cases great loss of hair. Among the husbands of these women, seven escaped contagion, but there is reason to believe that they had not cohabited with their wives; but the eight others, who had connection with their wives not long after delivery, exhibited well-marked syphilitic symptoms. Among the infants the eruption appeared in some at the end of a week, and in others at the latest before the end of the second. Of the fifteen infants of these women, nine suffered from the disease, and four of these died. In none of the cases observed was there either bubo or blenorrhagia present.—*Med. Times and Gazette*, May 25, 1874.

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62. *Comparison between Hysterotomy and Ovariotomy.*—In a clinical lecture delivered at the Hôtel-Dieu M. Richet drew a comparison between hysterotomy and ovariotomy. He pointed out that there was no relation between them in regard to their mortality; that in hysterotomy it was necessary to make the opening sufficiently large to permit the whole tumour to escape, whereas in ovariotomy, when no adhesions are present, a very small opening is all that is requisite to allow the cyst to be emptied and its collapsed walls to be drawn out. In hysterotomy the incisions must often extend from the pubis to the xyphoid cartilage. Hence the extremely dangerous nature of the operation. To diminish this danger it has been proposed to cut the uterus away piece by piece; but there is then the danger of fatal hemorrhage. Secondly, when the opening into the abdomen is made and the tumour has been removed, an extensive sutured wound remains, and the chances of evisceration are great, and it has actually happened in M. Richet's practice; and although in this instance the patient really died from pyæmia, the danger is not less real. The chief difficulty of the operation of hysterotomy is that of pediculating the tumour. In ovariotomy the walls of the cyst are often thin, and after the evacuation of the liquid a ligature can easily be applied; on the contrary, in hysterotomy the pedicle is often so large that it is often requisite to divide it into two parts, and ligature each half separately. It is necessary to tie the ligatures sufficiently tight to prevent hemorrhage; at the same time care must be taken not to lacerate the tissues, which are often sufficiently friable. After the ligature has been applied it remains to draw the pedicle to the surface, but the pedicle is inextensible, and in fact is directly continuous with the uterus. Hence for some time after the operation the patient experiences severe dragging pains in the pelvis, and sometimes it is absolutely necessary to relax the ligature and to remove the clamp. In ovariotomy it is possible to cause complete adhesion between the peritoneum and the pedicle; in hysterotomy this is not possible, and then a wall is formed from which it is requisite to remove the purulent

contents with the utmost care by frequent washing.—*Practitioner*, March, 1874, from *Le Progres Méd.*, Jan. 10, 1874.

63. *On the Local Treatment of Gangrenous Vulvitis in Young Girls by Iodoform Powder.*—This serious affection is in some cases connected with convalescence from scarlatina, the sequelæ of a severe attack of fever, or some similar assemblage of unhealthy conditions affecting the whole of the organism. The younger Guersant and M. Trousseau have given some most useful counsels on this subject. After the indications given by the most powerful modifying agents, these two practitioners have not feared to have recourse to the disorganizing action of the actual cautery. This agent has, according to their experience, proved the least uncertain method of circumscribing the limits of the evil. MM. Rilliet and Barthez employed chloride of zinc for the same object, but these means are all very painful, and if, as it is affirmed in the *Progrès Médical*, M. PARROT, the surgeon to the Paris Children's Hospital, has succeeded in avoiding the disagreeable effects of this somewhat barbarous treatment, he will have effected great good. The topical application used at that establishment by the distinguished surgeon in question, is the iodoform powder, which is absolutely painless in use. During several years, M. Parrot has been tolerably successful in his treatment of ulcerated gangrenous vulvitis; combating it by the use of dressings of concentrated solution of chlorate of potash frequently renewed, or cauterizations with nitrate of silver. But neither of these methods, nor others needless to recapitulate, have been so uniformly successful as the iodoform. Iodoform alone, tried as a last resource after other topical applications, generally appeared to arrest the invading progress of ulcer in two or three days, and to rapidly facilitate the appearance of fleshy germs in the bottom of the wound. Iodoform in this case acts in the same way as in chancrous bubos, fungous ulcers, and hospital gangrene. But in order to attain the desired end the iodoform powder must be freely used; not the smallest portion of the wound must remain uncovered by it. When the bottom of the ulceration is very wet and the detritus plentiful, it is advisable to renew the dressing twice a day during the first two days.

The author of the article asserts that he has always very rapidly succeeded in modifying the appearance of these ulcerations by the use of this dressing, and even that he has so completely arrested their progress that none, which have been treated in the way indicated, have exceeded the size of a sixpence. It must also be noticed that this arrest of extension is accompanied by a rapid disappearance of the contiguous œdema, which raises the edges of the ulcerations and gives them a cup-like appearance.—*London Med. Record*, April, 1874.

64. *The Danger of Intra-Uterine Injections.*—The *Gazette de Joulin* gives the details of two cases, which show that while intra-uterine injections are energetic agents in modifying the conditions of this mucous cavity, they should be employed only with caution.

In one case, though the patient had become enfeebled by repeated hemorrhage, she endured, without suffering inconvenience, two injections of the uterine cavity. A third, consisting of a weak infusion of chamomile and diluted perchloride of iron, was succeeded by death in thirty hours, after decided symptoms of subacute peritonitis. The mucous lining of the uterus and right Fallopian tube, and the adjacent peritoneal surface, were found, after death, covered with an ink-black clot, and presenting unmistakable evidences of inflammation.—*Medical Examiner*, March 15, 1874.

AMERICAN INTELLIGENCE.

ORIGINAL COMMUNICATIONS.

Addendum to Art. IV. On Laparotomy as a Remedy in Cases of Intussusception, etc. By JOHN ASHHURST, Jr., M.D., etc.

Since my paper in the present number of the JOURNAL has been printed, the *Edinburgh Medical Journal* for June, and the last published volume (Vol. XIX., 3d Ser.) of the *Guy's Hospital Reports* have been received, and I find, in the former, a case of laparotomy for intussusception in a child five months old, terminating fatally on the second day, reported by Dr. John Duncan, and, in the latter, two cases of laparotomy for obstruction by a band—one fatal, one successful—reported by the operator, Mr. Howse, and a third case (fatal) of laparotomy for partial obstruction resulting from intestinal ulceration and omental adhesion, reported by the same gentleman as having occurred in the practice of Mr. Davies-Colley. This gives fourteen cases of laparotomy for intussusception, with five recoveries and nine deaths, or, if the cases recorded in this century only are considered, twelve with nine deaths, a mortality of 75 per cent. Adding Mr. Howse's three cases to the fifty-seven in the table (p. 61), we have a total of sixty cases of laparotomy for other causes than intussusception, with nineteen recoveries and forty-one deaths, a mortality of 68.33 per cent., or, including examples of intussusception, a grand total of 74 cases, with 24 recoveries and 50 deaths, a mortality of 67.57 per cent. In the *Lancet's* report of the discussion on Mr. Hutchinson's paper at the Royal Medico-Chirurgical Society of London (*Lancet*, Nov. 22, 1873, p. 738), Mr. Spencer Wells, after speaking of his published case of laparotomy for intussusception (*vide suprà*, p. 57), is represented as having said that "he had operated upon other cases;" but the results are not given. This sentence does not occur in the reports furnished by the *Medical Times and Gazette* and the *British Medical Journal*. In the *Quarterly Summary* of the present number of this Journal (p. 265) will be found an interesting case in which a German surgeon, Dr. Betz, began, but did not complete, the operation of laparotomy, finding after the first incision had been made that it was possible to relieve the obstruction by external manipulation.

Epistaxis successfully Treated by Injections of Diluted Solution of the Subsulphate of Iron. By FRANKLIN N. STAUB, M.D., of Pittsburgh, Pa.

Mrs. K, æt. 75, retired to bed April 12th, complaining only of a feeling of weariness, no doubt dependent upon her old age. At ten o'clock the following morning, she was awakened by a discharge of blood from both nose and mouth, running in a continuous stream and almost choking her. The first hemorrhage was soon checked by administering common salt, in saturated solution, and afterwards giving her pills, composed of one quarter of a grain of opium and one grain of tannic acid.

The patient, a very active little woman, two days after (in opposition to my express injunctions to the contrary), went out walking. The same

night she again bled, had a recurrence of the epistaxis, which the family were able to check with the means previously used.

She had another recurrence of the hemorrhage the following afternoon, and for the first time fainted. I now tried the use of hot pediluvia, cold to the nape of the neck, and compression of the anterior nares; but none of the above means answered the purpose; I again tried to plug her nose, but found it impossible to do so, owing to the conformation of the posterior nares, pharynx, and posterior palatine arches, which were all small and contracted. The hemorrhage still continued, and I determined to test the efficacy of the officinal solution of the subsulphate of iron. I diluted the officinal solution with water, using the two in about equal proportions, and used an ordinary urethral syringe to inject into each nostril about one half ounce. The blood immediately coagulated on coming into contact with the solution, forming clots, which came away in the next two or three days, since which time there has been no loss of blood.

The entire quantity lost by the patient amounts to nearly sixty ounces (by measure), which, considering her great age, is an enormous quantity.

Podophyllin for Acute Rheumatism.—By R. F. DYER, M.D., of Ottawa, Ill.

About five years ago I accidentally discovered that the active principle of *Podophyllum peltatum* promptly relieved the pains in acute rheumatism. I usually follow it with the "alkaline treatment," and if the pains return recur again to the podophyllin. I commence with light doses combined with Dover's powder at intervals of two to four hours until the bowels are moved very freely several times, and have been frequently astonished at the amount required to effect this. In some cases I have given it in broken doses for three days before it took effect. The more severe the case the more it required. While the bowels could be acted upon easily by other remedies, the action of this was delayed. Sometimes two or three evacuations relieve; at others it requires eight or ten. After the bowels are evacuated, if relief is not obtained, I continue the use of the medicine in broken doses, not large enough to produce vomiting. If the pain returns in two or three days, I repeat the treatment. The iodide of potassium is a favourite remedy with me, combined with a syrup of cimicifuga. I have thought that perhaps it was the free purgation that afforded relief, but upon trying active catharsis from other remedies, I am fully satisfied that there is some specific influence exerted by the podophyllin. Having fully tested this remedy in the past five years, I now recommend it to the profession in all confidence, having given it in a large number of cases without a single failure in its affording relief from pain as soon as a free catharsis was produced.

DOMESTIC SUMMARY.

Traumatic Aneurism of Neck, Ligation of Left Common Carotid, with Permanent Silver Wire Ligature.—Dr. R. W. GIBBES, late Professor of Anatomy and Surgery in University of South Carolina, reports (*Charleston Med. Journ. and Rev.*, Jan. 1874) the case of a coloured man, aged forty, who was shot in the chin, Nov. 19, 1872.

Dec. 6th. Marked *fremissement* was observed over the whole left side, and there existed no doubt of formation of consecutive diffused aneurism. Left

arm almost completely paralyzed. On December 9th patient was operated upon, the usual incision being made along anterior border of sterno-mastoid muscle. The descendens noni was soon observed on anterior and inner surface of sheath, and drawn back by a blunt hook, as was also the internal jugular vein, which passed obliquely in front of the carotid below, and almost overlapped it at the omo-hyoid crossing. On opening the sheath, just above the omo-hyoid, and having the nerve and vein drawn well back, the pneumogastric was seen between the vessels, and posteriorly very deep. The artery was now raised on a grooved director, and the aneurism needle, armed with a small double silver wire, passed under it. The "bruit" heard under the stethoscope ceased immediately when the wire was drawn upon so as to occlude the canal. I then tied it in a common reef knot, cutting the ends off close, without having constricted the vessel sufficiently to divide either coat. The very short ends were turned against the vessel, or rather upon the constricting noose, and the wound closed by four silver wire stitches, including thickness of platysma myoides in each. Two strips of isinglass plaster were applied, and the upper part of wound covered with collodion.

I should have stated that close behind the upper end of my incision I found and removed a small piece, say about one-eighth, of the conical ball, which had been split off by the shattering of the bone, and is what was felt before the operation. The rest of it lies much deeper, and could not be found, it having injured not only the artery, but a part of the brachial plexus.

A director was now passed into the original wound, on side of chin, and a counter puncture made on neck, about two and a half inches under it, and one inch anterior to the superior angle of incision, a tent being introduced from below upward, on account of the suppuration connected with wound of maxilla.

One year after ligation patient was examined. The paralysis of right leg, the result of the operation, is much diminished, but still quite perceptible, and he walks well with a cane. The loss of power in the left arm (caused by the wound) is also somewhat improved. He uses it in eating, and in cutting wood, and can grasp one's hand pretty firmly in his palm, but not with ends of his fingers.

On applying the stethoscope a loud bellows sound is heard, occupying the whole left carotid region from sterno-clavicular junction to angle of maxilla, which ceases the instant that his head is extended, or his face slightly turned to the right, and also as soon as slight pressure is made on the vessel pulsating immediately behind the corner of the os hyoides. Whether this is the lingual or superior thyroid, I find myself unable to determine, although I think it is the latter. The carotid is felt pulsating strongly above the point of ligation, but below it appears as a firm cord, with only a slight impulse communicated to it from the arch of the aorta. I cannot feel the double constricting wire, but when the finger presses firmly on the spot, he says *he* feels it. I should have mentioned that the *bruit* is synchronous with the first beat of the heart, and extends over the second, masking it completely. No murmur can be heard on the right side of the neck, and none in the precordial region.

On the Spectrum of Bile.—Dr. J. C. Dalton recently read before the New York Academy of Medicine (*New York Med. Journ.*, June, 1874) a paper in which he discussed, first, the spectrum presented by fresh bile, which depends on the presence of its normal colouring matters; and, secondly, the spectrum presented by the coloured fluid of Pettenkofer's test, which depends for its production on the presence of the biliary salts.

Dr. Dalton gives the results of a series of observations on the spectroscopic characters of a number of different specimens of bile as follows:—

I. The spectrum of bile is characterized, as a general rule, by an absorption-band at C.

II. The existence and intensity of this band are proportional to the predominance of green in the colour of the bile.

III. The spectrum of the bile is also distinguished by a diminution or absence of the orange and yellow, and a corresponding extension of the red and green.

IV. There are sometimes also two other absorption-bands, comparatively uncertain and ill-defined, at D and at D 30 E.

V. The pure biliary salts in alcoholic solution, treated by Pettenkofer's test, give a spectrum with absorption-bands at E and F.

VI. In a watery solution, treated by the same test, they give a spectrum with but one absorption-band, namely, at E.

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Treatment of Uterine Fibroid by Hypodermic Injections of Ergotine.—Dr. THEOPHILUS PARVIN records (*Am. Practitioner*, May, 1874) three cases of uterine fibroid, in which marked benefit followed the hypodermic administration of ergot. In all the cases heretofore treated, so far as Dr. Parvin knows, the ergotine has been administered with glycerine, which Dr. J. T. Bowls, of Knightstown, Ind., shows is a needless and may be injurious addition, causing in some cases painful inflammation and threatening abscesses, which was not observed when the glycerine was omitted, and the efficiency of the injection was not found to be lessened.

Dr. A. REEVES JACKSON reported to the Chicago Society of Physicians and Surgeons (*Chicago Med. Journ.*, June, 1874) five cases of fibrous tumour of the uterus treated by the method of Hildebrandt, and in three of them with decidedly favourable results.

Dr. Jackson obtained the best results from a solution prepared according to the following form: "Fifty grains of the extract (Squibb's) are dissolved in 250 minims of water, the solution filtered and made up to 300 minims, by passing water through the filter to wash it and the residue upon it. It represents ergot grain for minim, free from alcohol or other irritating substance."

Latterly he has used this solution exclusively, and thus far has seen no irritation, pain, or inflammation result from it.

He no longer selects the abdomen as the site for injection. Although some parts of the abdominal wall—as about the umbilicus, for example—may be less sensitive to puncture than others, yet all parts of it are more sensitive than the deltoid region; and inasmuch as the latter is more convenient, and the injections placed there equally efficacious, he now habitually selects the arm in preference to any other part of the body.

Another case was reported to the Society by Dr. J. H. ETHERIDGE, three by Dr. H. P. MERRIMAN, and one by Dr. S. FISHER, in all of which beneficial results followed the hypodermic use of ergotine.

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Inversion of Uterus; Prompt Replacement.—Dr. G. W. H. KEMPER reports (*Indiana Journ. Med.*, March, 1874) an example of this in a woman aged 33, in her sixth labour. Fifteen minutes after the birth of the child, a violent pain came on which expelled the placenta beyond the vulva, and completely inverted the uterus. His first suspicion of an inversion was caused by the uterus escaping his grasp above the pubes, and disappearing into the pelvis.

"There was no unusual amount of hemorrhage, and her pulse was good. There was not the least tendency to shock, and the woman was not aware that anything unusual had occurred, until I began its reduction. Without waiting for chloroform or assistant, I hastily separated the placenta, which was adherent to the fundus, before attempting to replace the uterus. Pushing my right hand through the vulva into the vagina, while steadying the tissues above the pubes with my left, I indented the fundus with the tips of my fingers, and maintained a constant, steady pressure in the direction of the axis of the pelvis. In about five minutes my efforts were rewarded with success. I kept my hand in the uterus for a few moments and satisfied myself that every portion had been fully restored, and the outlines of the organ distinctly perceptible through the abdominal walls."

Dr. K. states that he had made but slight traction on the cord, not sufficient to cause the inversion.

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Report on the Ovaries removed by Dr. Thomas.—In our preceding No., p. 577, we referred to the operation performed by Dr. T. G. Thomas for the removal of the ovaries. At the meeting of the New York Obstetrical Society,

February 17, Dr. NOEGGERATH read a detailed account of the macro- and microscopical examination of those ovaries. "The ovaries," he stated, "are of normal size, covered with numerous fine thread-like adhesions and filaments. Under the microscope both ovaries were found to be in a high degree of interstitial inflammation and fatty degeneration, the Graafian follicles partly obliterated and partly filled with hemorrhagic clots. A number of bodies similar to and probably Pacinian corpuscles, with what appeared to be nervous filaments leading to them, were found in the ovaries, from the whole appearance of which it was evident that no treatment short of removal would have been of service."

He attributes the constant and agonizing pain experienced by the patient in the ovaries not to the fatty degeneration, but principally to the inflammation of the peritoneal envelope of the organ and the consequent cicatricial contraction. This perimetritis may have been present since childhood, for he has seen a case in a child two and a half years of age.—*Am. Journ. of Obstet.*, May, 1874.

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Bromide of Ammonium in Catamenial Excesses.—Dr. J. K. BLACK, of Newark, Ohio, has often tested the efficiency of this preparation in non-structural excesses, and he speaks (*Cincinnati Lancet and Observer*, May, 1874) with confidence of its valuable powers. He says he no more certainly anticipates the arrest of an attack of ague by the administration of quinia than does he anticipate the control of the forms of catamenial excess referred to, by the proper administration of the bromide of ammonium.

In the administration of the remedy an essential rule is, that its use shall precede the expected period by at least ten days. Its administration only during the crisis will do very little, if any, good. The sedative influence of the remedy must precede and accompany the stage of ovarian and uterine vascular engorgement, which itself preceded the flow by several days.

Some writers have spoken quite favourably of the remedy in dysmenorrhœa and menorrhagia, administered in the usual manner; that is, during the crisis only. Having been frequently called to see cases of these disorders during their progress, I have failed to observe any very satisfactory evidence of its controlling power while administered only during the emergency. But when administered according to the above directions, it has not only, almost without exception, lessened a regular monthly excess, but it has, in appropriate cases, in quite a number of instances which I can recall to memory, changed a two-week into a four-week crisis.

It is only necessary to say to the inexperienced practitioner, that any associated disorder, which has even a remote bearing upon the menstrual excess, should receive appropriate attention, else the controlling power of the bromide may be more or less uncertain or transitory in its beneficial effects.

—

Observations on the Normal Pulse, Respiration, and Temperature of Puerperal Women.—Dr. G. WILDS LINN, late Resident Physician to the Philadelphia Hospital, reports his temperature observations in a series of 24 normal puerperal cases occurring in the Philadelphia Hospital. The observations were begun immediately after delivery and continued for nine days, during which time the patients were kept in bed. The temperature was observed in the axilla at 9 A. M. and 8 P. M. While the cases were under observation no alcoholic stimulants were allowed. The diet consisted of milk, eggs, beef-tea, and mutton, with coffee or tea, and bread, toasted or plain, with butter.

The conclusions deduced from these observations are:—

1. That the normal temperature of the puerperal woman is only about .6° F. higher than that of the healthy human being, if we accept the statement of Wunderlich, that the mean normal temperature is 98.6° F. (= 37° C.).

2. That the normal pulse of the puerperal woman is not more frequent than that found under ordinary conditions in a state of perfect health.

3. That the number of respirations is increased if the statement of physiologists be received, that the number of respirations of the healthy woman ranges from 18 to 20 per minute.

4. That the generally received opinion that the secretion of milk is attended by an increase in temperature of one or more degrees, and an increase in the frequency of the pulse of 10 or 12 beats per minute, is erroneous.

5. That a temperature of 100° F. (= 37.77° C.) or a pulse of 100 per minute in the lying-in woman is indicative of some pathological process which it behooves the accoucheur to discover at once, in order that proper measures may be taken to arrest its development and remove the evil.—*Philada. Med. Times*, May 9, 1874.

These observations are in accord with those previously published by Barker, Winkel, Wolff, and Baumfelden.

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Hydro-chloral by the Rectum in the Vomiting of Pregnancy.—Dr. D. B. SIMMONS, Chief Surgeon to Ken Hospital, Yokahama, Japan, reports (*Medical Record*, June 1, 1874) four cases of excessive vomiting of pregnancy in which 30 grain doses of chloral morning and evening, administered in mucilage by the rectum, afforded marked relief.

Should another opportunity offer, writes Dr. Simmons, for a trial of this plan of treatment, we have decided to commence with larger doses, being convinced that a decided impression, produced by the medicine at first, will require its repetition but two or three times to put an end to the disease, for the time at least.

We believe that hydro-chloral, administered in this manner, will relieve most cases of nervous or sympathetic vomiting, where there is no inflammation especially. Even in strangulated hernia, on theoretical grounds, it ought to act well, not only in checking the vomiting, but in producing relaxation. We should give it a trial also in cholera.

—

Drainage in Obstinate Chronic Inflammation of the Bladder.—Dr. HUNTER MCGUIRE reports (*Virginia Med. Monthly*) a case of "chronic inflammation, and probably ulceration of the bladder," of eight years' duration, successfully treated by drainage; but instead of effecting this by opening the vesico-vaginal septum, as done by Simpson, Emmet, and Parvin, he introduced a piece of gum tubing, the portion of which to be introduced into the bladder was perforated by a shoemaker's punch, with holes half an inch apart. A straight silver tube was first passed into the bladder, and the gum tubing introduced through it; the silver tube was then withdrawn, and the gum one secured in place, and the free end put into a bottle to catch the urine. A vaginal suppository of morphia and belladonna was introduced. The catheter was removed and cleaned, a new one substituted whenever necessary, and the vaginal suppository was also repeated every twelve hours. Afterwards Dr. McG. substituted a large silver catheter, nearly straight, with a large vesical opening for the gum tube. At the end of six weeks a gum bag was attached to the free end of the silver catheter, so as to allow the patient to get up and walk about. This treatment was continued for four months, when the tube was removed from the bladder. There was for some time afterwards incontinence of urine, but the bladder gradually regained its healthy power, and eight months after the commencement of the treatment the patient could retain her urine for about three hours, and void it without pain; and, except the increased frequency of micturition, which is growing less, the patient is reported to be well.

—

Restraint of Hemorrhage during Operation in the Mouth.—Prof. E. ANDREWS recommends (*Medical Examiner*, April, 1873) the following procedure, suggested to him by Dr. Ira Manly, of Markezan, Wis., to overcome the difficulties encountered from hemorrhage in operations in the mouth.

The patient being first etherized in the ordinary way, the mouth is held open by an instrument devised for the purpose by Prof. E., and then the spray from the ether spray apparatus is to be directed upon the roof of the mouth, but not with such intensity as to produce freezing. The cold thus produced contracts the vessels, so that Prof. E. was able to perform uranoplasty with comparatively little delay from hemorrhage, or accumulation of mucus. At the same

time the patient, constantly inhaling the spray, the anæsthetic was steadily maintained.

—

Surgical Treatment of Naso-pharyngeal Polypi.—Dr. David W. Cheever states (*Boston Med. and Surg. Journ.*, June 4. 1874) that "after a thorough review of all the measures which have been adopted to remove naso-pharyngeal polypi, we feel justified in drawing the following conclusions:—

"1. The excision, partial or complete, of the upper jaw is applicable only to the removal of tumours which grow from, or are attached to, some portion of that bone.

"2. Tumours having their origin either in the spheno-maxillary fossa, the posterior nares, or the body of the occipito-sphenoid bone, can be attacked and completely removed by one of the operations for displacing the upper jaw, or the nose.

"3. In this second class of cases, to remove any portion of the bony structures of the face, when they are unaffected by disease and could be displaced and restored, is to cause a needless mutilation, and is contrary to sound principles of conservative surgery.

"4. For tumours in the spheno-maxillary fossa, Langenbeck's major operation is applicable.

"5. For the growths in the posterior nares and top of the pharynx, Ollier's operation by displacing the nose; or Huguier's operation, modified by us in keeping the vascular connection of the palate and pterygoid processes unbroken, will either of them prove sufficient to eradicate the disease.

"6. In very large tumours, there is no reason, *à priori*, why our operation of displacing the *whole* upper jaw should not succeed."

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The Influence of Anæsthetics on the Vaso-motor Centres.—In an interesting investigation on the influence of anæsthetics on the vaso-motor centres Dr. H. P. Bowditch and Charles S. Minot, B.S., deduce (*Boston Med. and Surg. Journ.*, May 21, 1874) the following conclusion as possessing a high degree of probability:—

"While ether and chloroform resemble each other in their effect on those nervous centres whose activity is connected with the conscious perception of pain, the latter acts much more strongly than the former upon those centres which regulate the arterial blood-tension, and thus affects profoundly the conditions of animal life. Ether and chloroform are, therefore, both anæsthetics, but chloroform is, also, something more."

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Modification of Trommer's Test for Sugar.—Dr. George B. Fowler made some interesting remarks before the Northwestern Medical and Surgical Society, New York (*N. Y. Med. Journ.*, June, 1874), relating to the various tests of urine, and particularly with reference to a modification of Trommer's test for sugar. In order to use this test, take one ounce of water and add to it one drop of honey: apply Trommer's test to a portion in a test-tube, and the chemical reaction will take place. Take one ounce of urine and add to it one drop or as much honey as you please; apply Trommer's test, and a transparent molasses-colour will result. Take the precipitated red oxide of copper which resulted in the watery solution in the first case and add boiling urine: the red precipitate will immediately disappear. The urine, therefore, possesses the property of dissolving the red oxide of copper, upon the appearance of which Trommer's test depends. But a certain quantity of urine can only dissolve a certain amount of the copper. So, if we add an excess of copper, this excess will be precipitated by the sugar, and the usual reaction will show itself. But when three or four drachms of urine are used, as is always the case, the quantity of potash solution which will have to be added in order to produce a clear blue colour will overrun an ordinary-sized test-tube. Therefore, take from five to ten drops of the suspected urine and add two or three drops of the sulphate of copper solution (1 ʒ to 1 ℥). Then pour in the alkali until a transparent blue colour appears. Now boil, and the reaction will be perfectly distinct and satisfactory.

JEFFERSON MEDICAL COLLEGE.

PHILADELPHIA, PA.

The next annual session will commence on Monday, October 5th, 1874. Preliminary Lectures from Monday, September 7th, 1874.

FACULTY.

JOSEPH PANCOAST, M.D., Emeritus.
S. D. GROSS, M.D., LL.D., D.C.L. Oxon., Surgery.
ELLERSLIE WALLACE, M.D., Obstetrics.
B. H. RAND, M.D., Chemistry.
J. B. BIDDLE, M.D., Materia Medica.
J. A. MEIGS, M.D., Institutes of Medicine.
J. M. DA COSTA, M.D., Practice of Medicine.
W. H. PANCOAST, M.D., Anatomy.

The Surgical Clinic will be under the charge of Professors JOSEPH PANCOAST, S. D. GROSS, and W. H. PANCOAST.

The Medical Clinic by Professors DA COSTA, RAND, BIDDLE, and MEIGS. Professors DA COSTA and MEIGS give clinical instruction at the Pennsylvania Hospital, in the immediate vicinity of the College.

The Clinic of Diseases of Women by Professor WALLACE.

The Eye and Ear Clinic by Drs. R. J. LEVIS and W. THOMSON, Surgeons to the Wills Hospital. Clinical Instruction is also given at the Philadelphia Hospital. The surgical staff of this hospital includes Professor PANCOAST, and Drs. JOHN H. BRINTON and F. F. MAURY, lecturers at the Jefferson College.

T. H. ANDREWS, M.D., Demonstrator of Anatomy.
J. EWING MEARS, M.D., Demonstrator of Surgery.

Subjects in the Dissecting Room are furnished *free of expense*, and there are no incidental charges.

Number of students last session, 473; of graduates, 151. Fees, full course, $140; Matriculation fee (paid once only) $5; Graduation fee, $30.

J. B. BIDDLE, M.D.,
Dean.

BELLEVUE HOSPITAL MEDICAL COLLEGE—CITY OF NEW YORK.

SESSION OF 1874-75.

THE Collegiate year in this Institution embraces a Preliminary Autumnal Term, the regular Winter Session, and a Summer Session.

The Preliminary Autumnal Term for 1874-75 will commence on Wednesday, September 16, 1874, and continue until the opening of the Regular Session. During this term, instruction, consisting of didactic lectures on special subjects and daily clinical lectures, will be given, as heretofore, by the entire Faculty. Students designing to attend the Regular Session are strongly recommended to attend the Preliminary Term, but attendance during the latter is not required. *During the Preliminary Term Clinical and Didactic Lectures will be given in precisely the same number and order as in the Regular Session.*

The Regular Session will commence on Wednesday, September 30, 1874, and end about the 1st of March, 1875.

FACULTY.

ISAAC E. TAYLOR, M.D., Emeritus Professor of Obstetrics and Diseases of Women and Children, and President of the College.

JAMES R. WOOD, M.D., LL.D., Emeritus Professor of Surgery.

FORDYCE BARKER, M.D., Professor of Clinical Midwifery and Diseases of Women.

AUSTIN FLINT, M.D., Professor of the Principles and Practice of Medicine and Clinical Medicine.

FRANK H. HAMILTON, M.D., LL.D., Professor of Practice of Surgery with Operations and Clinical Surgery.

LEWIS A. SAYRE, M.D., Professor of Orthopedic Surgery and Clinical Surgery.

ALEXANDER B. MOTT, M.D., Professor of Clinical and Operative Surgery.

W. H. VAN BUREN, M.D., Professor of Principles of Surgery, with Diseases of the Genito-Urinary System and Clinical Surgery.

WILLIAM T. LUSK, M.D., Professor of Obstetrics and Diseases of Women and Children, and Clinical Midwifery.

EDMUND R. PEASLEE, M.D., LL.D., Professor of Gynæcology.

EDWARD G. JANEWAY, M.D., Lecturer on Materia Medica and Therapeutics and Clinical Medicine.

AUSTIN FLINT, JR., M.D., Professor of Physiology and Physiological Anatomy, and Secretary of the Faculty.

ALPHEUS B. CROSBY, M.D., Professor of General, Discriptive, and Surgical Anatomy.

R. OGDEN DOREMUS, M.D., Professor of Chemistry and Toxicology.

Professors of Special Departments, etc.

HENRY D. NOYES, M.D., Professor of Ophthalmology and Otology.

EDWARD L. KEYES, M.D., Professor of Dermatology, and Assistant to the Chair of Principles of Surgery, etc.

EDWARD G. JANEWAY, M.D., Professor of Pathological and Practical Anatomy. (Demonstrator of Anatomy.)

A distinctive feature of the method of instruction in this College, is the union of clinical and didactic teaching. All the lectures are given within the hospital grounds. During the Regular Winter Session, in addition to four didactic lectures on every week day, except Saturday, two or three hours are daily allotted to clinical instruction. The union of clinical and didactic teaching will also be carried out in the Summer Session; nearly all of the teachers in this Faculty being physicians and surgeons to the Bellevue Hospital.

The Summer Session will consist chiefly of Recitations from Text-books. This term continues from the middle of March to the middle of June. During this Session there will be daily recitations in all the departments held by a corps of examiners appointed by the regular Faculty. Regular Clinics will also be held.

Fees for the Regular Session.

Fees for Tickets to all the Lectures during the Preliminary and Regular Term, including Clinical Lectures	$140 00
Matriculation Fee	5 00
Demonstrator's Ticket (including material for dissection)	10 00
Graduation Fee	30 00

Fees for the Summer Session.

Matriculation (Ticket good for the following Winter)	$5 00
Recitations and Clinics	20 00
Dissecting (Ticket good for the following Winter)	10 00

For the Annual Circular and Catalogue, giving regulations for graduation and other information, address the Secretary of the College, Prof. AUSTIN FLINT, JR., Bellevue Hospital Medical College.

HARVARD UNIVERSITY.

MEDICAL DEPARTMENT—BOSTON, MASS.

NINETY-FIRST ANNUAL ANNOUNCEMENT. (1874-75.)

FACULTY OF MEDICINE.

CHARLES W. ELIOT, LL.D., President.
CALVIN ELLIS, M.D., Prof. of Clinical Medicine, Dean.
JOHN B. S. JACKSON, M.D., Prof. of Pathol. Anat.
OLIVER W. HOLMES, M.D., Prof. of Anatomy.
GEORGE C. SHATTUCK, M.D., Professor of the Theory and Practice of Physic.
HENRY J. BIGELOW, M.D., Professor of Surgery.
GEORGE DERBY, M.D., Professor of Hygiene.
JOHN E. TYLER, M.D., Prof. of Mental Diseases.
CHARLES E. BUCKINGHAM, M.D., Prof. of Obstetrics and Medical Jurisprudence.
FRANCIS MINOT, M.D., Assistant Professor of the Theory and Practice of Medicine, and Clinical Lecturer on the Diseases of Women and Children.
JOHN P. REYNOLDS, M.D., Instructor in Obstetrics.
HENRY W. WILLIAMS, M.D., Professor of Ophthalmology.
DAVID W. CHEEVER, M.D., Adjunct Professor Clinical Surgery.
JAMES C. WHITE, M.D., Prof. of Dermatology.
ROBERT T. EDES, M.D., Assistant Professor of Materia Medica.
HENRY P. BOWDITCH, M.D., Assistant Professor of Physiology.
CHARLES B. PORTER, M.D., Demonstrator of Anatomy, and Instructor in Surgery.
FREDERICK I. KNIGHT, M.D., Instructor in Percussion, Auscultation, and Laryngoscopy.
J. COLLINS WARREN, M.D., Instructor in Surgery.
REGINALD H. FITZ, M.D., Ass't Professor of Pathological Anatomy.
EDWARD S. WOOD, M.D., Ass't Professor of Chemistry.
HENRY H. A. BEACH, M.D., Assistant Demonstrator of Anatomy.

LECTURERS.

FRANCIS B. GREENOUGH, M.D., and EDWARD WIGGLESWORTH, Jr., M.D., on Syphilis.
J. ORNE GREEN, M.D., and CLARENCE J. BLAKE, M.D., on Otology.
JAMES R. CHADWICK, M.D., on Diseases of Women. CHARLES P. PUTNAM, M.D., on Diseases of Children.
JAMES J. PUTNAM, M.D., on the Application of Electricity in Nervous Diseases.

The plan of study was radically changed in 1871. Instruction is given by lectures, recitations, clinical teaching, and practical exercises, distributed throughout the academic year. This year begins October 1st, 1874, and ends on the last Wednesday in June, 1875. It is divided into two equal terms, with a recess of one week between them. Either of these two terms is more than equivalent to the former "Winter Session," as regards the amount and character of the instruction. The course of instruction has been greatly enlarged, so as to extend over three years, and has been so arranged as to carry the student progressively and systematically from one subject to another in a just and natural order. In the subjects of anatomy, histology, chemistry, and pathological anatomy, laboratory work is largely substituted for, or added to, the usual methods of instruction.

Instead of the customary, hasty, oral examination for the degree of Doctor of Medicine, held at the end of the three years' period of study, a series of examinations on all the main subjects of medical instruction has been distributed through the whole three years; and every candidate for the degree must pass a satisfactory examination in every one of the principal departments of medical instruction during his period of study.

DIVISION OF STUDIES.

For the First Year—Anatomy, Physiology, and General Chemistry.
For the Second Year—Medical Chemistry, Materia Medica, Pathological Anatomy, Theory and Practice of Medicine, Clinical Medicine, Surgery and Clinical Surgery.
For the Third Year—Therapeutics, Obstetrics, Theory and Practice of Medicine, Clinical Medicine, Surgery and Clinical Surgery.

Students are divided into three classes, according to their time of study and proficiency. Students who began their professional studies elsewhere may be admitted to advanced standing; but all persons who apply for admission to the second or third year's class must pass an examination in the branches already pursued by the class to which they seek admission. Examinations are held in the following order:—

At the end of the first year—Anatomy, Physiology, and General Chemistry.
End of second year—Medical Chemistry, Materia Medica, and Pathological Anatomy.
End of third year—Therapeutics, Obstetrics, Theory and Practice of Medicine, Clinical Medicine, and Surgery.

Examinations are also held a week before the opening of the School in September.

Students who do not intend to offer themselves for a degree will also be received at any part of the course, for one term or more. Any student may obtain, without an examination, a certificate of his period of connection with the school.

REQUIREMENTS FOR A DEGREE.—Every candidate must be twenty-one years of age; must have studied medicine three full years, have spent at least one continuous year at this School, have passed the required examinations, and have presented a thesis.

COURSE FOR GRADUATES.—For the purpose of affording to those already Graduates of Medicine additional facilities for pursuing clinical, laboratory and other studies, in such subjects as may specially interest them, the Faculty has established a course which comprises the following branches: Physiology; Medical Chemistry; Pathological Anatomy; Surgery; Auscultation, Percussion and Laryngoscopy; Ophthalmology; Otology; Hygiene; Dermatology; Syphilis; Psychological Medicine; Electro-therapeutics; Gynæcology; and Obstetrics.

Single branches may be pursued, and on payment of the full fee also the privilege of attending any of the other exercises of the Medical School, the use of its laboratories and library, and all other rights accorded by the University will be granted. Graduates of other Medical Schools who may desire to obtain the degree of M.D. at this University, will be admitted to examination for this degree after a year's study in the Graduates' Course.

FEES.—For Matriculation, $5; for the Year, $200; for one Term alone, $120; for Graduation, $30. For Graduates' Course, the fee for one year is $200; for one Term, $120; and for single courses such fees as are specified in the Catalogue. Payment in advance.

Members of any one department of Harvard University have a right to attend lectures and recitations in any other department without paying additional fees.

For further information, or Catalogue, address

DR. R. H. FITZ, *Sec'y*, 108 Boylston St., Boston, Mass.

MEDICAL DEPARTMENT OF THE UNIVERSITY OF LOUISIANA—NEW ORLEANS.

MEDICAL FACULTY.

A. H. Cenas, M.D., Emeritus Professor of Obstetrics and Diseases of Women and Children.
T. G. Richardson, M.D., Professor of General and Clinical Surgery.
Samuel M. Bemiss, M.D., Professor of the Theory and Practice of Medicine and Clinical Medicine.
Stanford E. Chaille, M.D., Professor of Physiology and Pathological Anatomy.
James Jones, M.D., Professor of Obstetrics and Diseases of Women and Children.
Joseph Jones, M.D., Professor of Chemistry and Clinical Medicine.
Samuel Logan, M.D., Professor of Anatomy and Clinical Surgery.
Frank Hawthorn, M.D., Professor of Materia Medica and Clinical Lecturer upon Obstetrics and Diseases of Women and Children.
Edmond Souchon, M.D., Demonstrator of Anatomy.

The next annual course of instruction in this Department (now in the fortieth year of its existence) will commence on Monday, the 16th day of November, 1874, and terminate on the third Saturday of March, 1875. Preliminary Lectures on Clinical Medicine and Surgery will be delivered in the amphitheatre of the Charity Hospital, beginning on the 20th of October, without any charge to students.

The means of teaching now at the command of the Faculty are unsurpassed in the United States. In addition to the regular didactic lectures given by the several Professors, there is attached to each separate chair a Practical Department, in which students can observe and verify for themselves the facts inculcated and discussed in the lecture-room. It is to this peculiar feature of the University, and its unequalled hospital advantages, that the Faculty would direct the attention of those engaged in the study of Medicine, or who, having graduated elsewhere, desire to perfect themselves in any particular branch of the profession.

CLINICAL INSTRUCTION.

The act establishing the University of Louisiana gives the Professors of the Medical Department the use of the Charity Hospital as a school of practical instruction.

The Charity Hospital contains nearly 700 beds, and received during the past year more than *six thousand* patients. Its advantages for professional study are unequalled by any similar institution in this country. The medical, surgical, and obstetric wards are visited daily by the respective professors in charge, from 8 to 10 o'clock A. M., at which time all the students are expected to attend and familiarize themselves, *at the bedside of the patients*, with the diagnosis and treatment of all forms of injury and disease.

Special instruction is given to the candidates for graduation, who are, for this purpose, divided by the Dean of the Faculty into classes, and assigned to the respective professors in charge of wards in the hospital. The classes thus formed interchange courses so as to enable the candidates to enjoy equal advantages. Thoroughly competent Chiefs of Clinic will aid the Clinical Teachers in developing to its full extent this system of instruction. Students who are not candidates for graduation make the daily hospital rounds with any of the clinical teachers. The following professors and their respective Chiefs of Clinic will be on duty during the ensuing year.

The regular lectures at the hospital, on Clinical Medicine by Professors Bemiss and Joseph Jones, Surgery by Professors Richardson and Logan, Diseases of Women and Children by Professor Hawthorn, and Special Pathological Anatomy by Professor Chaillé, will be delivered in the amphitheatre on Monday, Wednesday, Thursday, and Saturday, from 10 to 12 o'clock A. M.

Obstetrical cases are assigned to the candidates for graduation under the direction of the Clinical Teacher. *Post-mortem* examinations are made in the presence of the class.

The administration of the hospital elect annually twelve resident students, who are nominated by the institution.

TERMS.

For the Tickets of all the Professors	$140 00
For the Ticket of Practical Anatomy	10 00
Matriculation Fee	5 00
Graduation Fee	30 00

Graduates of other recognized schools may attend all the lectures upon payment of the matriculation fee; but they will not be admitted as candidates for the Diploma of the University except upon the terms required of second course students. All fees are payable in advance.

For further information, address T. G. RICHARDSON, M.D., *Dean.*

BOYLSTON MEDICAL PRIZE QUESTIONS.

The Boylston Medical Committee, appointed by the President and Fellows of Harvard University, announce that at the annual meeting, held June 1, 1874, it was voted that no dissertation worthy of a prize had been offered on either of the subjects proposed for 1874.

The following are the subjects proposed for 1875:—

1. Original Researches in Medical Science.

2. So-called "Concussion of the Spine."

The author of a dissertation considered worthy of a prize, on either of the subjects proposed for 1875, will be entitled to a premium of One Hundred and Fifty Dollars.

Dissertations on the above subjects must be transmitted, post paid, to J. B. S. Jackson, M.D., Boston, *on or before the first Wednesday in April*, 1875.

The following are the questions proposed for 1876:—

1. Civil Hospital-Construction (not of Lunatic Asylums); Location, Materials, Arrangement, Warming, Ventilation, Drainage, Lighting; with Designs.

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